

# Calculated Photon Kerma Factors Based on the LLNL EGDL Data File

R. J. Howerton

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**R. J. Howerton**

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## Foreword

The UCRL-50400 series, *An Integrated System for Production of Neutronics and Photonics Calculational Constants*, describes an integrated, computer-oriented system for the production and application of neutronics and photonics calculational constants.

The system supplies reliable, up-to-date data, selects specific types of data on request, provides output in a variety of forms (ultimately in the form of input to other computer codes), and functions rapidly and efficiently.

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- Vol. 26, A Bibliography and Index for Nuclear Reactions Among Light Charged Particles, September 1984.
- Vol. 27, Calculated Neutron KERMA Factors Based on the LLNL ENDL Data File, January 1986.
- Vol. 28, Index to the LLNL Evaluated Charged-Particle Library (ECPL), March 1986.

## **ABSTRACT**

Photon (Gamma-Ray) KERMA factors calculated from the LLNL EGDL (Evaluated Gamma-Ray Data Library) file are tabulated for the elements from Z=1 to Z=30 and for 15 composite materials. The KERMA factors are presented for 191 energy groups over the incident photon energy range from 100 eV to 100 MeV.

## INTRODUCTION

Photon (Gamma-Ray) KERMA factors (Kinetic Energy Released in Matter) are used to assess physiological damage incurred by exposure to Gamma-Rays and to determine heating in materials of interest from photon interactions with matter. The energy release is obtained by forming the product of the photon KERMA factor and the photon fluence at the appropriate photon energy. Generally, the KERMA factor for a photon induced reaction is defined to be the energy available less the energy carried off by secondary photons. The KERMA factor for a material is then obtained by summing the KERMA factors of the individual reactions, properly weighted by elemental abundance in the case of composite materials.

In the context of this report, only photon interactions with atoms and molecules are considered. The energy deposited from photo-nuclear reactions is not included. Thus, for photon energies greater than the least threshold of a photo-nuclear reaction of a naturally occurring isotope of an element, the values presented here will not include all contributions to the photon KERMA factors. This deficiency is caused by the lack of evaluated data needed to include the photo-nuclear phenomena in the calculated KERMA factors. An effort is currently underway to create a photo-nuclear data library so that future tabulations of photon KERMA factors can include contributions from such reactions. Since the least threshold of a photo-nuclear reaction occurs in the few MeV region for naturally occurring isotopes, photon KERMA values presented here will be accurate for lesser energies, within the limitations of the data.

Explicit energy distributions for secondary photons are included in the EGDL (Evaluated Gamma-Ray Data Library, See Ref. 1) for each reaction. From these distributions, average photon secondary energies are calculated and the result subtracted from the available energy to obtain the requisite energy for the reaction to calculate the KERMA factor. This value and all others for the various reactions are cross section weighted to obtain the photon-energy dependent KERMA factor for the element. For the composite materials, the KERMA factors for the individual elements are combined according to their weight fractions to obtain the value for the composite.

The tables of KERMA factors are presented for 191 energy groups from .0001 to 100 MeV. For photon energies between .001 and 20 MeV the group boundaries correspond to the energies used by Singh (Ref. 2) so

that comparisons may be made between the values presented here and those of Reference 2.

The compositions of the composite materials used here were taken from Caswell et al., (Ref. 3). The composition used here differs slightly from that of Singh (Ref. 2) for 'Standard Man' which is the only composite material given in common.

The values presented in the tables are given in units of Gray  $\text{cm}^2$ . The Gray is equivalent to one Joule per kg or 100 rads or 10000 ergs per gm or  $6.24196 \times 10^{10}$  MeV per gm.

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KERMA  
Gray cm<sup>-2</sup>

| Energy-MeV | - H-      | -He-      | -Li-      | -Be-      | - B-      | - C-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 1.000e-04  |           |           |           |           |           |           |
| 1.080e-04  | 1.754e-10 | 8.524e-10 | 1.895e-09 | 1.232e-10 | 2.369e-10 | 4.207e-10 |
| 1.140e-04  | 1.565e-10 | 8.225e-10 | 1.838e-09 | 1.457e-09 | 2.312e-10 | 4.099e-10 |
| 1.360e-04  | 1.184e-10 | 7.246e-10 | 1.645e-09 | 2.631e-09 | 2.103e-10 | 3.715e-10 |
| 1.560e-04  | 8.516e-11 | 5.131e-10 | 1.219e-09 | 2.175e-09 | 1.625e-10 | 2.846e-10 |
| 1.700e-04  | 6.705e-11 | 4.213e-10 | 1.028e-09 | 1.942e-09 | 1.384e-10 | 2.458e-10 |
| 1.840e-04  | 5.655e-11 | 3.766e-10 | 9.291e-10 | 1.791e-09 | 1.235e-10 | 2.256e-10 |
| 1.910e-04  | 5.061e-11 | 3.350e-10 | 8.363e-10 | 1.647e-09 | 1.114e-09 | 2.063e-10 |
| 2.140e-04  | 4.234e-11 | 2.819e-10 | 7.173e-10 | 1.458e-09 | 2.187e-09 | 1.811e-10 |
| 2.240e-04  | 3.710e-11 | 2.625e-10 | 6.735e-10 | 1.383e-09 | 2.091e-09 | 1.709e-10 |
| 2.410e-04  | 3.256e-11 | 2.488e-10 | 6.420e-10 | 1.324e-09 | 2.028e-09 | 1.630e-10 |
| 2.470e-04  | 2.815e-11 | 2.347e-10 | 6.092e-10 | 1.263e-09 | 1.959e-09 | 1.548e-10 |
| 2.630e-04  | 2.505e-11 | 2.185e-10 | 5.713e-10 | 1.191e-09 | 1.875e-09 | 1.452e-10 |
| 2.750e-04  | 2.298e-11 | 1.950e-10 | 5.156e-10 | 1.085e-09 | 1.749e-09 | 1.312e-10 |
| 2.820e-04  | 2.144e-11 | 1.768e-10 | 4.728e-10 | 1.003e-09 | 1.650e-09 | 1.204e-10 |
| 2.960e-04  | 1.953e-11 | 1.546e-10 | 4.200e-10 | 9.023e-10 | 1.526e-09 | 1.897e-09 |
| 3.180e-04  | 1.679e-11 | 1.277e-10 | 3.556e-10 | 7.784e-10 | 1.369e-09 | 2.002e-09 |
| 3.550e-04  | 1.376e-11 | 1.142e-10 | 3.216e-10 | 7.114e-10 | 1.263e-09 | 1.885e-09 |
| 3.610e-04  | 1.172e-11 | 1.025e-10 | 2.920e-10 | 6.522e-10 | 1.166e-09 | 1.775e-09 |
| 3.700e-04  | 1.128e-11 | 9.778e-11 | 2.800e-10 | 6.280e-10 | 1.127e-09 | 1.728e-09 |
| 3.830e-04  | 1.058e-11 | 9.035e-11 | 2.610e-10 | 5.895e-10 | 1.063e-09 | 1.654e-09 |
| 4.030e-04  | 9.420e-12 | 7.818e-11 | 2.298e-10 | 5.263e-10 | 9.592e-10 | 1.530e-09 |
| 4.150e-04  | 8.581e-12 | 7.081e-11 | 2.107e-10 | 4.869e-10 | 8.939e-10 | 1.448e-09 |
| 4.300e-04  | 8.088e-12 | 6.800e-11 | 2.032e-10 | 4.704e-10 | 8.663e-10 | 1.409e-09 |
| 4.500e-04  | 7.375e-12 | 6.386e-11 | 1.921e-10 | 4.460e-10 | 8.251e-10 | 1.350e-09 |
| 4.810e-04  | 6.504e-12 | 5.682e-11 | 1.731e-10 | 4.040e-10 | 7.538e-10 | 1.246e-09 |
| 5.160e-04  | 5.509e-12 | 4.693e-11 | 1.462e-10 | 3.445e-10 | 6.522e-10 | 1.096e-09 |
| 5.470e-04  | 4.725e-12 | 4.166e-11 | 1.318e-10 | 3.127e-10 | 5.961e-10 | 1.009e-09 |
| 5.550e-04  | 4.269e-12 | 3.889e-11 | 1.242e-10 | 2.958e-10 | 5.658e-10 | 9.604e-10 |
| 5.930e-04  | 3.937e-12 | 3.515e-11 | 1.138e-10 | 2.728e-10 | 5.242e-10 | 8.935e-10 |
| 5.980e-04  | 3.607e-12 | 3.136e-11 | 1.033e-10 | 2.494e-10 | 4.819e-10 | 8.251e-10 |
| 6.250e-04  | 3.429e-12 | 2.971e-11 | 9.852e-11 | 2.388e-10 | 4.624e-10 | 7.940e-10 |
| 6.540e-04  | 3.154e-12 | 2.752e-11 | 9.203e-11 | 2.244e-10 | 4.354e-10 | 7.511e-10 |
| 6.750e-04  | 2.914e-12 | 2.532e-11 | 8.547e-11 | 2.097e-10 | 4.078e-10 | 7.072e-10 |
| 6.980e-04  | 2.704e-12 | 2.317e-11 | 7.903e-11 | 1.953e-10 | 3.808e-10 | 6.639e-10 |
| 7.110e-04  | 2.531e-12 | 2.157e-11 | 7.422e-11 | 1.843e-10 | 3.604e-10 | 6.309e-10 |
| 7.250e-04  | 2.419e-12 | 2.090e-11 | 7.222e-11 | 1.794e-10 | 3.516e-10 | 6.161e-10 |
| 7.710e-04  | 2.166e-12 | 1.929e-11 | 6.732e-11 | 1.673e-10 | 3.302e-10 | 5.795e-10 |
| 7.940e-04  | 1.927e-12 | 1.722e-11 | 6.101e-11 | 1.517e-10 | 3.026e-10 | 5.323e-10 |
| 8.180e-04  | 1.787e-12 | 1.589e-11 | 5.696e-11 | 1.417e-10 | 2.846e-10 | 5.017e-10 |
| 8.380e-04  | 1.697e-12 | 1.512e-11 | 5.453e-11 | 1.358e-10 | 2.737e-10 | 4.835e-10 |
| 8.600e-04  | 1.610e-12 | 1.435e-11 | 5.210e-11 | 1.299e-10 | 2.626e-10 | 4.651e-10 |
| 8.980e-04  | 1.501e-12 | 1.314e-11 | 4.828e-11 | 1.207e-10 | 2.452e-10 | 4.361e-10 |
| 9.200e-04  | 1.387e-12 | 1.210e-11 | 4.438e-11 | 1.119e-10 | 2.287e-10 | 4.095e-10 |
| 9.400e-04  | 1.303e-12 | 1.174e-11 | 4.188e-11 | 1.076e-10 | 2.201e-10 | 3.978e-10 |
| 9.560e-04  | 1.230e-12 | 1.142e-11 | 3.961e-11 | 1.036e-10 | 2.123e-10 | 3.870e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - H-      | -He-      | -Li-      | -Be-      | - B-      | - C-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.800e-04  | 1.181e-12 | 1.104e-11 | 3.694e-11 | 9.885e-11 | 2.030e-10 | 3.742e-10 |
| 9.900e-04  | 1.143e-12 | 1.070e-11 | 3.457e-11 | 9.464e-11 | 1.947e-10 | 3.627e-10 |
| 1.000e-03  | 1.120e-12 | 1.048e-11 | 3.312e-11 | 9.207e-11 | 1.896e-10 | 3.556e-10 |
| 1.080e-03  | 1.083e-12 | 1.014e-11 | 3.179e-11 | 8.908e-11 | 1.838e-10 | 3.460e-10 |
| 1.140e-03  | 1.028e-12 | 9.636e-12 | 3.046e-11 | 8.533e-11 | 1.764e-10 | 3.323e-10 |
| 1.360e-03  | 8.632e-13 | 8.103e-12 | 2.628e-11 | 7.359e-11 | 1.531e-10 | 2.890e-10 |
| 1.560e-03  | 5.224e-13 | 4.937e-12 | 1.745e-11 | 4.883e-11 | 1.035e-10 | 1.968e-10 |
| 1.700e-03  | 3.863e-13 | 3.665e-12 | 1.373e-11 | 3.840e-11 | 8.244e-11 | 1.575e-10 |
| 1.840e-03  | 3.322e-13 | 3.150e-12 | 1.202e-11 | 3.366e-11 | 7.264e-11 | 1.391e-10 |
| 1.910e-03  | 2.830e-13 | 2.682e-12 | 1.046e-11 | 2.931e-11 | 6.361e-11 | 1.222e-10 |
| 2.140e-03  | 2.215e-13 | 2.096e-12 | 8.485e-12 | 2.382e-11 | 5.219e-11 | 1.007e-10 |
| 2.240e-03  | 2.009e-13 | 1.899e-12 | 7.788e-12 | 2.188e-11 | 4.812e-11 | 9.300e-11 |
| 2.410e-03  | 1.882e-13 | 1.776e-12 | 7.324e-12 | 2.059e-11 | 4.538e-11 | 8.780e-11 |
| 2.470e-03  | 1.753e-13 | 1.652e-12 | 6.853e-12 | 1.929e-11 | 4.258e-11 | 8.249e-11 |
| 2.630e-03  | 1.607e-13 | 1.511e-12 | 6.317e-12 | 1.780e-11 | 3.939e-11 | 7.643e-11 |
| 2.750e-03  | 1.396e-13 | 1.308e-12 | 5.540e-12 | 1.564e-11 | 3.475e-11 | 6.761e-11 |
| 2.820e-03  | 1.236e-13 | 1.153e-12 | 4.947e-12 | 1.398e-11 | 3.121e-11 | 6.085e-11 |
| 2.960e-03  | 1.039e-13 | 9.645e-13 | 4.222e-12 | 1.196e-11 | 2.687e-11 | 5.258e-11 |
| 3.180e-03  | 8.070e-14 | 7.405e-13 | 3.352e-12 | 9.540e-12 | 2.165e-11 | 4.263e-11 |
| 3.550e-03  | 7.118e-14 | 6.461e-13 | 2.953e-12 | 8.423e-12 | 1.919e-11 | 3.790e-11 |
| 3.610e-03  | 6.319e-14 | 5.673e-13 | 2.616e-12 | 7.476e-12 | 1.710e-11 | 3.386e-11 |
| 3.700e-03  | 5.997e-14 | 5.356e-13 | 2.480e-12 | 7.095e-12 | 1.626e-11 | 3.223e-11 |
| 3.830e-03  | 5.491e-14 | 4.860e-13 | 2.267e-12 | 6.496e-12 | 1.493e-11 | 2.966e-11 |
| 4.030e-03  | 4.666e-14 | 4.052e-13 | 1.919e-12 | 5.518e-12 | 1.277e-11 | 2.547e-11 |
| 4.150e-03  | 4.185e-14 | 3.575e-13 | 1.711e-12 | 4.933e-12 | 1.146e-11 | 2.294e-11 |
| 4.300e-03  | 4.027e-14 | 3.409e-13 | 1.635e-12 | 4.718e-12 | 1.098e-11 | 2.199e-11 |
| 4.500e-03  | 3.793e-14 | 3.167e-13 | 1.524e-12 | 4.404e-12 | 1.027e-11 | 2.060e-11 |
| 4.810e-03  | 3.393e-14 | 2.758e-13 | 1.336e-12 | 3.873e-12 | 9.066e-12 | 1.824e-11 |
| 5.160e-03  | 2.836e-14 | 2.191e-13 | 1.074e-12 | 3.131e-12 | 7.384e-12 | 1.494e-11 |
| 5.470e-03  | 2.579e-14 | 1.909e-13 | 9.410e-13 | 2.752e-12 | 6.515e-12 | 1.322e-11 |
| 5.550e-03  | 2.454e-14 | 1.768e-13 | 8.733e-13 | 2.558e-12 | 6.069e-12 | 1.234e-11 |
| 5.930e-03  | 2.281e-14 | 1.578e-13 | 7.821e-13 | 2.296e-12 | 5.467e-12 | 1.114e-11 |
| 5.980e-03  | 2.105e-14 | 1.386e-13 | 6.898e-13 | 2.032e-12 | 4.856e-12 | 9.932e-12 |
| 6.250e-03  | 2.054e-14 | 1.320e-13 | 6.574e-13 | 1.939e-12 | 4.641e-12 | 9.502e-12 |
| 6.540e-03  | 2.019e-14 | 1.255e-13 | 6.245e-13 | 1.843e-12 | 4.418e-12 | 9.057e-12 |
| 6.750e-03  | 1.979e-14 | 1.188e-13 | 5.909e-13 | 1.746e-12 | 4.190e-12 | 8.600e-12 |
| 6.980e-03  | 1.935e-14 | 1.122e-13 | 5.576e-13 | 1.649e-12 | 3.964e-12 | 8.145e-12 |
| 7.110e-03  | 1.895e-14 | 1.063e-13 | 5.279e-13 | 1.563e-12 | 3.762e-12 | 7.740e-12 |
| 7.250e-03  | 1.861e-14 | 1.016e-13 | 5.041e-13 | 1.494e-12 | 3.600e-12 | 7.413e-12 |
| 7.710e-03  | 1.775e-14 | 9.006e-14 | 4.461e-13 | 1.325e-12 | 3.204e-12 | 6.617e-12 |
| 7.940e-03  | 1.663e-14 | 7.546e-14 | 3.726e-13 | 1.112e-12 | 2.702e-12 | 5.608e-12 |
| 8.180e-03  | 1.604e-14 | 6.716e-14 | 3.306e-13 | 9.894e-13 | 2.414e-12 | 5.028e-12 |
| 8.380e-03  | 1.605e-14 | 6.479e-14 | 3.179e-13 | 9.520e-13 | 2.325e-12 | 4.846e-12 |
| 8.600e-03  | 1.607e-14 | 6.261e-14 | 3.061e-13 | 9.172e-13 | 2.241e-12 | 4.676e-12 |
| 8.980e-03  | 1.607e-14 | 5.915e-14 | 2.875e-13 | 8.621e-13 | 2.110e-12 | 4.407e-12 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - H-      | -He-      | -Li-      | -Be-      | - B-      | - C-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.200e-03  | 1.603e-14 | 5.533e-14 | 2.671e-13 | 8.017e-13 | 1.965e-12 | 4.111e-12 |
| 9.400e-03  | 1.598e-14 | 5.243e-14 | 2.516e-13 | 7.556e-13 | 1.854e-12 | 3.886e-12 |
| 9.560e-03  | 1.592e-14 | 4.978e-14 | 2.375e-13 | 7.139e-13 | 1.754e-12 | 3.681e-12 |
| 9.800e-03  | 1.583e-14 | 4.667e-14 | 2.210e-13 | 6.649e-13 | 1.637e-12 | 3.440e-12 |
| 1.000e-02  | 1.571e-14 | 4.306e-14 | 2.018e-13 | 6.080e-13 | 1.500e-12 | 3.161e-12 |
| 1.040e-02  | 1.735e-14 | 4.175e-14 | 1.913e-13 | 5.755e-13 | 1.421e-12 | 2.999e-12 |
| 1.080e-02  | 2.074e-14 | 4.242e-14 | 1.877e-13 | 5.623e-13 | 1.387e-12 | 2.928e-12 |
| 1.110e-02  | 2.370e-14 | 4.288e-14 | 1.839e-13 | 5.486e-13 | 1.352e-12 | 2.854e-12 |
| 1.190e-02  | 2.833e-14 | 4.334e-14 | 1.764e-13 | 5.222e-13 | 1.286e-12 | 2.714e-12 |
| 1.270e-02  | 3.503e-14 | 4.352e-14 | 1.626e-13 | 4.752e-13 | 1.167e-12 | 2.464e-12 |
| 1.300e-02  | 3.961e-14 | 4.331e-14 | 1.511e-13 | 4.368e-13 | 1.070e-12 | 2.261e-12 |
| 1.390e-02  | 4.459e-14 | 4.268e-14 | 1.364e-13 | 3.880e-13 | 9.480e-13 | 2.004e-12 |
| 1.470e-02  | 5.159e-14 | 4.125e-14 | 1.124e-13 | 3.092e-13 | 7.506e-13 | 1.589e-12 |
| 1.520e-02  | 5.694e-14 | 3.994e-14 | 9.271e-14 | 2.449e-13 | 5.894e-13 | 1.250e-12 |
| 1.570e-02  | 6.123e-14 | 4.112e-14 | 8.931e-14 | 2.308e-13 | 5.521e-13 | 1.170e-12 |
| 1.640e-02  | 6.642e-14 | 4.314e-14 | 8.850e-14 | 2.237e-13 | 5.312e-13 | 1.123e-12 |
| 1.700e-02  | 7.202e-14 | 4.526e-14 | 8.719e-14 | 2.147e-13 | 5.050e-13 | 1.065e-12 |
| 1.720e-02  | 7.547e-14 | 4.652e-14 | 8.616e-14 | 2.084e-13 | 4.871e-13 | 1.025e-12 |
| 1.810e-02  | 8.019e-14 | 4.820e-14 | 8.441e-14 | 1.987e-13 | 4.597e-13 | 9.648e-13 |
| 1.900e-02  | 8.789e-14 | 5.085e-14 | 8.087e-14 | 1.807e-13 | 4.094e-13 | 8.539e-13 |
| 1.970e-02  | 9.470e-14 | 5.308e-14 | 7.699e-14 | 1.623e-13 | 3.587e-13 | 7.425e-13 |
| 2.010e-02  | 9.937e-14 | 5.456e-14 | 7.403e-14 | 1.488e-13 | 3.215e-13 | 6.606e-13 |
| 2.100e-02  | 1.049e-13 | 5.704e-14 | 7.481e-14 | 1.462e-13 | 3.114e-13 | 6.364e-13 |
| 2.170e-02  | 1.117e-13 | 6.027e-14 | 7.686e-14 | 1.464e-13 | 3.075e-13 | 6.247e-13 |
| 2.230e-02  | 1.172e-13 | 6.287e-14 | 7.840e-14 | 1.462e-13 | 3.034e-13 | 6.130e-13 |
| 2.310e-02  | 1.231e-13 | 6.565e-14 | 7.994e-14 | 1.457e-13 | 2.980e-13 | 5.984e-13 |
| 2.550e-02  | 1.364e-13 | 7.189e-14 | 8.299e-14 | 1.428e-13 | 2.816e-13 | 5.558e-13 |
| 2.920e-02  | 1.616e-13 | 8.343e-14 | 8.710e-14 | 1.318e-13 | 2.361e-13 | 4.437e-13 |
| 3.320e-02  | 1.928e-13 | 9.791e-14 | 9.298e-14 | 1.205e-13 | 1.853e-13 | 3.163e-13 |
| 3.750e-02  | 2.255e-13 | 1.141e-13 | 1.050e-13 | 1.277e-13 | 1.807e-13 | 2.887e-13 |
| 4.200e-02  | 2.594e-13 | 1.308e-13 | 1.172e-13 | 1.338e-13 | 1.725e-13 | 2.518e-13 |
| 4.740e-02  | 2.964e-13 | 1.493e-13 | 1.321e-13 | 1.460e-13 | 1.776e-13 | 2.429e-13 |
| 4.850e-02  | 3.202e-13 | 1.613e-13 | 1.418e-13 | 1.541e-13 | 1.817e-13 | 2.389e-13 |
| 5.020e-02  | 3.303e-13 | 1.663e-13 | 1.459e-13 | 1.574e-13 | 1.829e-13 | 2.360e-13 |
| 5.500e-02  | 3.534e-13 | 1.779e-13 | 1.556e-13 | 1.664e-13 | 1.899e-13 | 2.387e-13 |
| 6.100e-02  | 3.909e-13 | 1.968e-13 | 1.716e-13 | 1.813e-13 | 2.021e-13 | 2.451e-13 |
| 6.750e-02  | 4.332e-13 | 2.182e-13 | 1.897e-13 | 1.990e-13 | 2.182e-13 | 2.578e-13 |
| 6.950e-02  | 4.613e-13 | 2.323e-13 | 2.019e-13 | 2.111e-13 | 2.298e-13 | 2.683e-13 |
| 7.350e-02  | 4.806e-13 | 2.421e-13 | 2.102e-13 | 2.194e-13 | 2.375e-13 | 2.750e-13 |
| 7.840e-02  | 5.086e-13 | 2.562e-13 | 2.223e-13 | 2.312e-13 | 2.484e-13 | 2.838e-13 |
| 8.070e-02  | 5.308e-13 | 2.674e-13 | 2.318e-13 | 2.405e-13 | 2.568e-13 | 2.902e-13 |
| 8.550e-02  | 5.526e-13 | 2.784e-13 | 2.413e-13 | 2.501e-13 | 2.663e-13 | 2.995e-13 |
| 8.800e-02  | 5.747e-13 | 2.896e-13 | 2.509e-13 | 2.599e-13 | 2.762e-13 | 3.095e-13 |
| 9.050e-02  | 5.896e-13 | 2.971e-13 | 2.574e-13 | 2.664e-13 | 2.827e-13 | 3.160e-13 |
| 9.230e-02  | 6.022e-13 | 3.034e-13 | 2.629e-13 | 2.720e-13 | 2.883e-13 | 3.215e-13 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - H-      | -He-      | - Li-     | - Be-     | - B-      | - C-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.600e-02  | 6.180e-13 | 3.114e-13 | 2.698e-13 | 2.789e-13 | 2.952e-13 | 3.282e-13 |
| 1.000e-01  | 6.399e-13 | 3.225e-13 | 2.793e-13 | 2.885e-13 | 3.047e-13 | 3.373e-13 |
| 1.050e-01  | 6.937e-13 | 3.495e-13 | 3.027e-13 | 3.124e-13 | 3.292e-13 | 3.631e-13 |
| 1.100e-01  | 7.778e-13 | 3.919e-13 | 3.392e-13 | 3.498e-13 | 3.680e-13 | 4.047e-13 |
| 1.150e-01  | 8.601e-13 | 4.333e-13 | 3.750e-13 | 3.865e-13 | 4.060e-13 | 4.455e-13 |
| 1.210e-01  | 9.485e-13 | 4.777e-13 | 4.134e-13 | 4.258e-13 | 4.468e-13 | 4.891e-13 |
| 1.350e-01  | 1.103e-12 | 5.555e-13 | 4.806e-13 | 4.946e-13 | 5.181e-13 | 5.652e-13 |
| 1.490e-01  | 1.308e-12 | 6.587e-13 | 5.698e-13 | 5.859e-13 | 6.124e-13 | 6.655e-13 |
| 1.640e-01  | 1.510e-12 | 7.605e-13 | 6.579e-13 | 6.761e-13 | 7.059e-13 | 7.653e-13 |
| 1.800e-01  | 1.719e-12 | 8.658e-13 | 7.489e-13 | 7.695e-13 | 8.030e-13 | 8.698e-13 |
| 1.980e-01  | 1.933e-12 | 9.735e-13 | 8.420e-13 | 8.651e-13 | 9.024e-13 | 9.766e-13 |
| 2.180e-01  | 2.163e-12 | 1.089e-12 | 9.420e-13 | 9.677e-13 | 1.009e-12 | 1.091e-12 |
| 2.390e-01  | 2.405e-12 | 1.211e-12 | 1.048e-12 | 1.076e-12 | 1.122e-12 | 1.213e-12 |
| 2.630e-01  | 2.652e-12 | 1.336e-12 | 1.155e-12 | 1.187e-12 | 1.237e-12 | 1.338e-12 |
| 2.900e-01  | 2.908e-12 | 1.465e-12 | 1.267e-12 | 1.301e-12 | 1.356e-12 | 1.466e-12 |
| 3.190e-01  | 3.169e-12 | 1.596e-12 | 1.380e-12 | 1.418e-12 | 1.478e-12 | 1.597e-12 |
| 3.510e-01  | 3.456e-12 | 1.740e-12 | 1.505e-12 | 1.546e-12 | 1.611e-12 | 1.741e-12 |
| 3.860e-01  | 3.744e-12 | 1.885e-12 | 1.631e-12 | 1.675e-12 | 1.746e-12 | 1.886e-12 |
| 4.240e-01  | 4.031e-12 | 2.030e-12 | 1.756e-12 | 1.804e-12 | 1.880e-12 | 2.031e-12 |
| 4.670e-01  | 4.349e-12 | 2.190e-12 | 1.894e-12 | 1.946e-12 | 2.028e-12 | 2.191e-12 |
| 5.130e-01  | 4.671e-12 | 2.352e-12 | 2.035e-12 | 2.090e-12 | 2.178e-12 | 2.353e-12 |
| 5.650e-01  | 5.153e-12 | 2.595e-12 | 2.245e-12 | 2.306e-12 | 2.403e-12 | 2.596e-12 |
| 6.210e-01  | 5.693e-12 | 2.867e-12 | 2.480e-12 | 2.547e-12 | 2.654e-12 | 2.867e-12 |
| 6.830e-01  | 6.267e-12 | 3.156e-12 | 2.730e-12 | 2.804e-12 | 2.922e-12 | 3.156e-12 |
| 7.510e-01  | 6.845e-12 | 3.447e-12 | 2.982e-12 | 3.062e-12 | 3.191e-12 | 3.447e-12 |
| 8.260e-01  | 7.405e-12 | 3.729e-12 | 3.226e-12 | 3.313e-12 | 3.453e-12 | 3.729e-12 |
| 9.090e-01  | 8.017e-12 | 4.037e-12 | 3.492e-12 | 3.587e-12 | 3.738e-12 | 4.037e-12 |
| 1.000e+00  | 8.626e-12 | 4.344e-12 | 3.757e-12 | 3.859e-12 | 4.021e-12 | 4.343e-12 |
| 1.120e+00  | 9.443e-12 | 4.756e-12 | 4.114e-12 | 4.224e-12 | 4.402e-12 | 4.755e-12 |
| 1.270e+00  | 1.052e-11 | 5.300e-12 | 4.585e-12 | 4.708e-12 | 4.907e-12 | 5.300e-12 |
| 1.420e+00  | 1.153e-11 | 5.806e-12 | 5.023e-12 | 5.159e-12 | 5.376e-12 | 5.807e-12 |
| 1.600e+00  | 1.245e-11 | 6.269e-12 | 5.424e-12 | 5.571e-12 | 5.807e-12 | 6.272e-12 |
| 1.800e+00  | 1.354e-11 | 6.825e-12 | 5.907e-12 | 6.068e-12 | 6.327e-12 | 6.837e-12 |
| 2.030e+00  | 1.458e-11 | 7.348e-12 | 6.362e-12 | 6.539e-12 | 6.821e-12 | 7.373e-12 |
| 2.280e+00  | 1.586e-11 | 7.999e-12 | 6.930e-12 | 7.128e-12 | 7.439e-12 | 8.047e-12 |
| 2.570e+00  | 1.729e-11 | 8.728e-12 | 7.569e-12 | 7.791e-12 | 8.139e-12 | 8.812e-12 |
| 2.890e+00  | 1.855e-11 | 9.377e-12 | 8.142e-12 | 8.391e-12 | 8.777e-12 | 9.514e-12 |
| 3.250e+00  | 1.970e-11 | 9.977e-12 | 8.676e-12 | 8.956e-12 | 9.382e-12 | 1.019e-11 |
| 3.650e+00  | 2.114e-11 | 1.072e-11 | 9.341e-12 | 9.660e-12 | 1.014e-11 | 1.103e-11 |
| 4.110e+00  | 2.239e-11 | 1.139e-11 | 9.944e-12 | 1.031e-11 | 1.084e-11 | 1.182e-11 |
| 4.620e+00  | 2.390e-11 | 1.219e-11 | 1.067e-11 | 1.109e-11 | 1.170e-11 | 1.279e-11 |
| 5.200e+00  | 2.539e-11 | 1.299e-11 | 1.141e-11 | 1.190e-11 | 1.259e-11 | 1.380e-11 |
| 5.850e+00  | 2.699e-11 | 1.386e-11 | 1.221e-11 | 1.278e-11 | 1.356e-11 | 1.491e-11 |
| 6.580e+00  | 2.866e-11 | 1.478e-11 | 1.308e-11 | 1.373e-11 | 1.463e-11 | 1.614e-11 |
| 7.410e+00  | 3.066e-11 | 1.588e-11 | 1.412e-11 | 1.489e-11 | 1.592e-11 | 1.763e-11 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - H-      | -He-      | -Li-      | -Be-      | - B-      | - C-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 8.330e+00  | 3.235e-11 | 1.686e-11 | 1.507e-11 | 1.598e-11 | 1.717e-11 | 1.910e-11 |
| 9.370e+00  | 3.441e-11 | 1.805e-11 | 1.624e-11 | 1.731e-11 | 1.871e-11 | 2.092e-11 |
| 1.060e+01  | 3.652e-11 | 1.932e-11 | 1.750e-11 | 1.879e-11 | 2.043e-11 | 2.298e-11 |
| 1.190e+01  | 3.918e-11 | 2.087e-11 | 1.903e-11 | 2.054e-11 | 2.245e-11 | 2.538e-11 |
| 1.340e+01  | 4.175e-11 | 2.241e-11 | 2.058e-11 | 2.236e-11 | 2.457e-11 | 2.791e-11 |
| 2.000e+01  | 4.775e-11 | 2.629e-11 | 2.467e-11 | 2.731e-11 | 3.052e-11 | 3.517e-11 |
| 3.000e+01  | 6.076e-11 | 3.483e-11 | 3.377e-11 | 3.841e-11 | 4.390e-11 | 5.158e-11 |
| 4.000e+01  | 7.490e-11 | 4.462e-11 | 4.454e-11 | 5.180e-11 | 6.027e-11 | 7.183e-11 |
| 5.000e+01  | 8.915e-11 | 5.473e-11 | 5.578e-11 | 6.587e-11 | 7.752e-11 | 9.323e-11 |
| 7.500e+01  | 1.150e-10 | 7.323e-11 | 7.641e-11 | 9.171e-11 | 1.092e-10 | 1.324e-10 |
| 1.000e+02  | 1.532e-10 | 1.009e-10 | 1.075e-10 | 1.307e-10 | 1.570e-10 | 1.917e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - N -     | - O -     | - F -     | - Ne -    | - Na -    | - Mg -    |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 1.000e-04  |           |           |           |           |           |           |
| 1.080e-04  | 7.019e-10 | 9.856e-10 | 1.374e-09 | 1.923e-09 | 1.971e-09 | 2.371e-09 |
| 1.140e-04  | 6.830e-10 | 9.614e-10 | 1.341e-09 | 1.830e-09 | 1.947e-09 | 2.359e-09 |
| 1.360e-04  | 6.165e-10 | 8.738e-10 | 1.222e-09 | 1.634e-09 | 1.833e-09 | 2.261e-09 |
| 1.560e-04  | 4.674e-10 | 6.746e-10 | 9.488e-10 | 1.379e-09 | 1.542e-09 | 1.981e-09 |
| 1.700e-04  | 4.015e-10 | 5.847e-10 | 8.242e-10 | 1.242e-09 | 1.396e-09 | 1.825e-09 |
| 1.840e-04  | 3.677e-10 | 5.366e-10 | 7.564e-10 | 1.145e-09 | 1.301e-09 | 1.713e-09 |
| 1.910e-04  | 3.357e-10 | 4.908e-10 | 6.918e-10 | 1.051e-09 | 1.210e-09 | 1.602e-09 |
| 2.140e-04  | 2.943e-10 | 4.316e-10 | 6.082e-10 | 9.215e-10 | 1.088e-09 | 1.454e-09 |
| 2.240e-04  | 2.793e-10 | 4.098e-10 | 5.774e-10 | 8.466e-10 | 1.042e-09 | 1.396e-09 |
| 2.410e-04  | 2.681e-10 | 3.934e-10 | 5.542e-10 | 7.811e-10 | 1.004e-09 | 1.348e-09 |
| 2.470e-04  | 2.563e-10 | 3.761e-10 | 5.297e-10 | 7.160e-10 | 9.641e-10 | 1.296e-09 |
| 2.630e-04  | 2.425e-10 | 3.558e-10 | 5.010e-10 | 6.672e-10 | 9.165e-10 | 1.234e-09 |
| 2.750e-04  | 2.220e-10 | 3.257e-10 | 4.585e-10 | 6.293e-10 | 8.456e-10 | 1.142e-09 |
| 2.820e-04  | 2.061e-10 | 3.024e-10 | 4.255e-10 | 6.001e-10 | 7.903e-10 | 1.071e-09 |
| 2.960e-04  | 1.865e-10 | 2.736e-10 | 3.848e-10 | 5.633e-10 | 7.218e-10 | 9.812e-10 |
| 3.180e-04  | 1.626e-10 | 2.384e-10 | 3.349e-10 | 5.145e-10 | 6.374e-10 | 8.709e-10 |
| 3.550e-04  | 1.500e-10 | 2.198e-10 | 3.082e-10 | 4.738e-10 | 5.900e-10 | 8.077e-10 |
| 3.610e-04  | 1.387e-10 | 2.032e-10 | 2.844e-10 | 4.367e-10 | 5.472e-10 | 7.503e-10 |
| 3.700e-04  | 1.341e-10 | 1.964e-10 | 2.747e-10 | 4.214e-10 | 5.296e-10 | 7.266e-10 |
| 3.830e-04  | 1.267e-10 | 1.855e-10 | 2.591e-10 | 3.972e-10 | 5.014e-10 | 6.889e-10 |
| 4.030e-04  | 2.411e-10 | 1.676e-10 | 2.334e-10 | 3.572e-10 | 4.549e-10 | 6.264e-10 |
| 4.150e-04  | 1.901e-09 | 1.566e-10 | 2.176e-10 | 3.325e-10 | 4.258e-10 | 5.871e-10 |
| 4.300e-04  | 1.863e-09 | 1.521e-10 | 2.112e-10 | 3.225e-10 | 4.135e-10 | 5.705e-10 |
| 4.500e-04  | 1.803e-09 | 1.455e-10 | 2.016e-10 | 3.074e-10 | 3.950e-10 | 5.454e-10 |
| 4.810e-04  | 1.697e-09 | 1.338e-10 | 1.849e-10 | 2.814e-10 | 3.629e-10 | 5.018e-10 |
| 5.160e-04  | 1.539e-09 | 1.168e-10 | 1.610e-10 | 2.443e-10 | 3.169e-10 | 4.394e-10 |
| 5.470e-04  | 1.434e-09 | 8.388e-10 | 1.478e-10 | 2.240e-10 | 2.916e-10 | 4.051e-10 |
| 5.550e-04  | 1.372e-09 | 1.608e-09 | 1.407e-10 | 2.132e-10 | 2.779e-10 | 3.865e-10 |
| 5.930e-04  | 1.286e-09 | 1.579e-09 | 1.308e-10 | 1.983e-10 | 2.591e-10 | 3.609e-10 |
| 5.980e-04  | 1.198e-09 | 1.546e-09 | 1.208e-10 | 1.830e-10 | 2.398e-10 | 3.346e-10 |
| 6.250e-04  | 1.156e-09 | 1.510e-09 | 1.161e-10 | 1.760e-10 | 2.307e-10 | 3.221e-10 |
| 6.540e-04  | 1.095e-09 | 1.434e-09 | 1.093e-10 | 1.662e-10 | 2.179e-10 | 3.043e-10 |
| 6.750e-04  | 1.033e-09 | 1.356e-09 | 1.025e-10 | 1.562e-10 | 2.047e-10 | 2.860e-10 |
| 6.980e-04  | 9.711e-10 | 1.279e-09 | 7.937e-10 | 1.464e-10 | 1.918e-10 | 2.680e-10 |
| 7.110e-04  | 9.245e-10 | 1.221e-09 | 1.402e-09 | 1.389e-10 | 1.821e-10 | 2.546e-10 |
| 7.250e-04  | 9.046e-10 | 1.198e-09 | 1.386e-09 | 1.358e-10 | 1.783e-10 | 2.494e-10 |
| 7.710e-04  | 8.552e-10 | 1.139e-09 | 1.341e-09 | 1.279e-10 | 1.686e-10 | 2.365e-10 |
| 7.940e-04  | 7.911e-10 | 1.061e-09 | 1.282e-09 | 1.178e-10 | 1.561e-10 | 2.197e-10 |
| 8.180e-04  | 7.493e-10 | 1.010e-09 | 1.238e-09 | 1.110e-10 | 1.479e-10 | 2.085e-10 |
| 8.380e-04  | 7.238e-10 | 9.765e-10 | 1.199e-09 | 1.066e-10 | 1.426e-10 | 2.009e-10 |
| 8.600e-04  | 6.979e-10 | 9.422e-10 | 1.159e-09 | 1.021e-10 | 1.372e-10 | 1.932e-10 |
| 8.980e-04  | 6.570e-10 | 8.877e-10 | 1.095e-09 | 1.123e-09 | 1.288e-10 | 1.810e-10 |
| 9.200e-04  | 6.200e-10 | 8.384e-10 | 1.036e-09 | 1.373e-09 | 1.221e-10 | 1.710e-10 |
| 9.400e-04  | 6.046e-10 | 8.178e-10 | 1.011e-09 | 1.342e-09 | 1.211e-10 | 1.686e-10 |
| 9.560e-04  | 5.904e-10 | 7.988e-10 | 7.873e-10 | 1.313e-09 | 1.202e-10 | 1.664e-10 |

**KERMA**  
**Gray cm<sup>-2</sup>**

| Renergy-MeV | - N-      | - O-      | - F-      | - Ne-     | - Na-     | - Mg-     |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.800e-04   | 5.734e-10 | 7.760e-10 | 9.591e-10 | 1.279e-09 | 1.191e-10 | 1.637e-10 |
| 9.900e-04   | 5.581e-10 | 7.555e-10 | 9.338e-10 | 1.248e-09 | 1.180e-10 | 1.612e-10 |
| 1.000e-03   | 5.486e-10 | 7.428e-10 | 9.181e-10 | 1.229e-09 | 1.173e-10 | 1.597e-10 |
| 1.080e-03   | 5.349e-10 | 7.249e-10 | 8.972e-10 | 1.201e-09 | 2.301e-10 | 1.536e-10 |
| 1.140e-03   | 5.145e-10 | 6.986e-10 | 8.672e-10 | 1.161e-09 | 1.213e-09 | 1.425e-10 |
| 1.360e-03   | 4.492e-10 | 6.133e-10 | 7.677e-10 | 1.027e-09 | 1.102e-09 | 3.682e-10 |
| 1.560e-03   | 3.097e-10 | 4.299e-10 | 5.515e-10 | 7.365e-10 | 8.509e-10 | 9.908e-10 |
| 1.700e-03   | 2.498e-10 | 3.505e-10 | 4.564e-10 | 6.092e-10 | 7.305e-10 | 8.871e-10 |
| 1.840e-03   | 2.214e-10 | 3.121e-10 | 4.089e-10 | 5.459e-10 | 6.607e-10 | 8.072e-10 |
| 1.910e-03   | 1.952e-10 | 2.765e-10 | 3.646e-10 | 4.870e-10 | 5.953e-10 | 7.318e-10 |
| 2.140e-03   | 1.619e-10 | 2.312e-10 | 3.082e-10 | 4.119e-10 | 5.111e-10 | 6.344e-10 |
| 2.240e-03   | 1.500e-10 | 2.148e-10 | 2.875e-10 | 3.844e-10 | 4.798e-10 | 5.978e-10 |
| 2.410e-03   | 1.418e-10 | 2.035e-10 | 2.729e-10 | 3.650e-10 | 4.570e-10 | 5.707e-10 |
| 2.470e-03   | 1.334e-10 | 1.918e-10 | 2.578e-10 | 3.451e-10 | 4.334e-10 | 5.425e-10 |
| 2.630e-03   | 1.239e-10 | 1.785e-10 | 2.405e-10 | 3.221e-10 | 4.061e-10 | 5.096e-10 |
| 2.750e-03   | 1.099e-10 | 1.590e-10 | 2.153e-10 | 2.885e-10 | 3.661e-10 | 4.614e-10 |
| 2.820e-03   | 9.921e-11 | 1.440e-10 | 1.958e-10 | 2.627e-10 | 3.352e-10 | 4.242e-10 |
| 2.960e-03   | 8.611e-11 | 1.257e-10 | 1.720e-10 | 2.310e-10 | 2.972e-10 | 3.784e-10 |
| 3.180e-03   | 7.032e-11 | 1.035e-10 | 1.431e-10 | 1.925e-10 | 2.510e-10 | 3.224e-10 |
| 3.550e-03   | 6.269e-11 | 9.261e-11 | 1.285e-10 | 1.731e-10 | 2.267e-10 | 2.923e-10 |
| 3.610e-03   | 5.616e-11 | 8.324e-11 | 1.159e-10 | 1.564e-10 | 2.056e-10 | 2.660e-10 |
| 3.700e-03   | 5.352e-11 | 7.945e-11 | 1.108e-10 | 1.496e-10 | 1.971e-10 | 2.553e-10 |
| 3.830e-03   | 4.937e-11 | 7.347e-11 | 1.027e-10 | 1.388e-10 | 1.835e-10 | 2.383e-10 |
| 4.030e-03   | 4.257e-11 | 6.369e-11 | 8.951e-11 | 1.212e-10 | 1.613e-10 | 2.105e-10 |
| 4.150e-03   | 3.846e-11 | 5.776e-11 | 8.147e-11 | 1.105e-10 | 1.476e-10 | 1.934e-10 |
| 4.300e-03   | 3.691e-11 | 5.549e-11 | 7.836e-11 | 1.064e-10 | 1.422e-10 | 1.865e-10 |
| 4.500e-03   | 3.463e-11 | 5.216e-11 | 7.377e-11 | 1.002e-10 | 1.343e-10 | 1.764e-10 |
| 4.810e-03   | 3.076e-11 | 4.648e-11 | 6.595e-11 | 8.975e-11 | 1.206e-10 | 1.589e-10 |
| 5.160e-03   | 2.533e-11 | 3.851e-11 | 5.494e-11 | 7.500e-11 | 1.014e-10 | 1.343e-10 |
| 5.470e-03   | 2.249e-11 | 3.431e-11 | 4.910e-11 | 6.717e-11 | 9.110e-11 | 1.210e-10 |
| 5.550e-03   | 2.102e-11 | 3.213e-11 | 4.604e-11 | 6.306e-11 | 8.565e-11 | 1.140e-10 |
| 5.930e-03   | 1.903e-11 | 2.917e-11 | 4.190e-11 | 5.748e-11 | 7.825e-11 | 1.043e-10 |
| 5.980e-03   | 1.701e-11 | 2.617e-11 | 3.769e-11 | 5.182e-11 | 7.073e-11 | 9.458e-11 |
| 6.250e-03   | 1.630e-11 | 2.510e-11 | 3.618e-11 | 4.979e-11 | 6.802e-11 | 9.104e-11 |
| 6.540e-03   | 1.555e-11 | 2.397e-11 | 3.459e-11 | 4.763e-11 | 6.512e-11 | 8.723e-11 |
| 6.750e-03   | 1.478e-11 | 2.281e-11 | 3.295e-11 | 4.541e-11 | 6.212e-11 | 8.329e-11 |
| 6.980e-03   | 1.401e-11 | 2.165e-11 | 3.131e-11 | 4.319e-11 | 5.912e-11 | 7.935e-11 |
| 7.110e-03   | 1.333e-11 | 2.062e-11 | 2.984e-11 | 4.120e-11 | 5.644e-11 | 7.582e-11 |
| 7.250e-03   | 1.278e-11 | 1.979e-11 | 2.866e-11 | 3.960e-11 | 5.428e-11 | 7.297e-11 |
| 7.710e-03   | 1.143e-11 | 1.776e-11 | 2.577e-11 | 3.568e-11 | 4.899e-11 | 6.599e-11 |
| 7.940e-03   | 9.729e-12 | 1.518e-11 | 2.211e-11 | 3.071e-11 | 4.227e-11 | 5.713e-11 |
| 8.180e-03   | 8.747e-12 | 1.370e-11 | 1.999e-11 | 2.783e-11 | 3.838e-11 | 5.198e-11 |
| 8.380e-03   | 8.438e-12 | 1.322e-11 | 1.931e-11 | 2.691e-11 | 3.711e-11 | 5.029e-11 |
| 8.600e-03   | 8.148e-12 | 1.278e-11 | 1.867e-11 | 2.603e-11 | 3.591e-11 | 4.870e-11 |
| 8.980e-03   | 7.688e-12 | 1.207e-11 | 1.765e-11 | 2.464e-11 | 3.400e-11 | 4.616e-11 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - N -     | - O -     | - F -     | - Ne -    | - Na -    | - Mg -    |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.200e-03  | 7.182e-12 | 1.130e-11 | 1.654e-11 | 2.311e-11 | 3.190e-11 | 4.335e-11 |
| 9.400e-03  | 6.796e-12 | 1.070e-11 | 1.568e-11 | 2.193e-11 | 3.029e-11 | 4.121e-11 |
| 9.560e-03  | 6.446e-12 | 1.016e-11 | 1.490e-11 | 2.087e-11 | 2.883e-11 | 3.926e-11 |
| 9.800e-03  | 6.033e-12 | 9.530e-12 | 1.399e-11 | 1.962e-11 | 2.711e-11 | 3.696e-11 |
| 1.000e-02  | 5.555e-12 | 8.794e-12 | 1.293e-11 | 1.816e-11 | 2.512e-11 | 3.429e-11 |
| 1.040e-02  | 5.276e-12 | 8.364e-12 | 1.230e-11 | 1.731e-11 | 2.394e-11 | 3.272e-11 |
| 1.080e-02  | 5.152e-12 | 8.170e-12 | 1.202e-11 | 1.692e-11 | 2.341e-11 | 3.200e-11 |
| 1.110e-02  | 5.023e-12 | 7.969e-12 | 1.173e-11 | 1.651e-11 | 2.285e-11 | 3.124e-11 |
| 1.190e-02  | 4.778e-12 | 7.586e-12 | 1.117e-11 | 1.574e-11 | 2.177e-11 | 2.979e-11 |
| 1.270e-02  | 4.342e-12 | 6.904e-12 | 1.017e-11 | 1.436e-11 | 1.986e-11 | 2.720e-11 |
| 1.300e-02  | 3.988e-12 | 6.349e-12 | 9.359e-12 | 1.323e-11 | 1.830e-11 | 2.509e-11 |
| 1.390e-02  | 3.539e-12 | 5.645e-12 | 8.330e-12 | 1.180e-11 | 1.633e-11 | 2.240e-11 |
| 1.470e-02  | 2.815e-12 | 4.509e-12 | 6.666e-12 | 9.489e-12 | 1.313e-11 | 1.807e-11 |
| 1.520e-02  | 2.223e-12 | 3.580e-12 | 5.306e-12 | 7.599e-12 | 1.051e-11 | 1.452e-11 |
| 1.570e-02  | 2.081e-12 | 3.355e-12 | 4.975e-12 | 7.136e-12 | 9.869e-12 | 1.364e-11 |
| 1.640e-02  | 1.996e-12 | 3.219e-12 | 4.773e-12 | 6.850e-12 | 9.471e-12 | 1.310e-11 |
| 1.700e-02  | 1.891e-12 | 3.050e-12 | 4.521e-12 | 6.495e-12 | 8.976e-12 | 1.242e-11 |
| 1.720e-02  | 1.819e-12 | 2.935e-12 | 4.350e-12 | 6.253e-12 | 8.639e-12 | 1.195e-11 |
| 1.810e-02  | 1.710e-12 | 2.759e-12 | 4.089e-12 | 5.883e-12 | 8.125e-12 | 1.125e-11 |
| 1.900e-02  | 1.511e-12 | 2.438e-12 | 3.613e-12 | 5.209e-12 | 7.187e-12 | 9.958e-12 |
| 1.970e-02  | 1.311e-12 | 2.117e-12 | 3.135e-12 | 4.532e-12 | 6.245e-12 | 8.663e-12 |
| 2.010e-02  | 1.164e-12 | 1.880e-12 | 2.784e-12 | 4.035e-12 | 5.553e-12 | 7.711e-12 |
| 2.100e-02  | 1.118e-12 | 1.806e-12 | 2.673e-12 | 3.876e-12 | 5.331e-12 | 7.405e-12 |
| 2.170e-02  | 1.095e-12 | 1.766e-12 | 2.611e-12 | 3.787e-12 | 5.206e-12 | 7.231e-12 |
| 2.230e-02  | 1.072e-12 | 1.727e-12 | 2.552e-12 | 3.701e-12 | 5.086e-12 | 7.063e-12 |
| 2.310e-02  | 1.043e-12 | 1.679e-12 | 2.478e-12 | 3.595e-12 | 4.937e-12 | 6.857e-12 |
| 2.550e-02  | 9.612e-13 | 1.542e-12 | 2.271e-12 | 3.295e-12 | 4.517e-12 | 6.273e-12 |
| 2.920e-02  | 7.489e-13 | 1.189e-12 | 1.738e-12 | 2.525e-12 | 3.443e-12 | 4.779e-12 |
| 3.320e-02  | 5.062e-13 | 7.837e-13 | 1.125e-12 | 1.636e-12 | 2.204e-12 | 3.056e-12 |
| 3.750e-02  | 4.421e-13 | 6.672e-13 | 9.415e-13 | 1.362e-12 | 1.817e-12 | 2.511e-12 |
| 4.200e-02  | 3.599e-13 | 5.199e-13 | 7.111e-13 | 1.017e-12 | 1.334e-12 | 1.831e-12 |
| 4.740e-02  | 3.276e-13 | 4.536e-13 | 6.011e-13 | 8.463e-13 | 1.093e-12 | 1.485e-12 |
| 4.850e-02  | 3.097e-13 | 4.155e-13 | 5.370e-13 | 7.459e-13 | 9.496e-13 | 1.280e-12 |
| 5.020e-02  | 2.998e-13 | 3.955e-13 | 5.041e-13 | 6.948e-13 | 8.774e-13 | 1.177e-12 |
| 5.500e-02  | 2.948e-13 | 3.790e-13 | 4.727e-13 | 6.428e-13 | 8.015e-13 | 1.066e-12 |
| 6.100e-02  | 2.900e-13 | 3.578e-13 | 4.301e-13 | 5.706e-13 | 6.952e-13 | 9.101e-13 |
| 6.750e-02  | 2.951e-13 | 3.514e-13 | 4.083e-13 | 5.284e-13 | 6.290e-13 | 8.092e-13 |
| 6.950e-02  | 3.022e-13 | 3.536e-13 | 4.036e-13 | 5.147e-13 | 6.050e-13 | 7.702e-13 |
| 7.350e-02  | 3.060e-13 | 3.531e-13 | 3.973e-13 | 5.007e-13 | 5.821e-13 | 7.343e-13 |
| 7.840e-02  | 3.100e-13 | 3.497e-13 | 3.841e-13 | 4.741e-13 | 5.405e-13 | 6.705e-13 |
| 8.070e-02  | 3.120e-13 | 3.452e-13 | 3.709e-13 | 4.488e-13 | 5.018e-13 | 6.119e-13 |
| 8.550e-02  | 3.197e-13 | 3.505e-13 | 3.725e-13 | 4.462e-13 | 4.940e-13 | 5.968e-13 |
| 8.800e-02  | 3.284e-13 | 3.573e-13 | 3.766e-13 | 4.471e-13 | 4.909e-13 | 5.883e-13 |
| 9.050e-02  | 3.340e-13 | 3.615e-13 | 3.786e-13 | 4.467e-13 | 4.874e-13 | 5.806e-13 |
| 9.230e-02  | 3.386e-13 | 3.648e-13 | 3.799e-13 | 4.456e-13 | 4.836e-13 | 5.729e-13 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - N -     | - O -     | - F -     | - Ne -    | - Na -    | - Mg -    |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.600e-02  | 3.442e-13 | 3.685e-13 | 3.810e-13 | 4.434e-13 | 4.775e-13 | 5.613e-13 |
| 1.000e-01  | 3.514e-13 | 3.729e-13 | 3.814e-13 | 4.387e-13 | 4.670e-13 | 5.423e-13 |
| 1.050e-01  | 3.759e-13 | 3.956e-13 | 4.004e-13 | 4.553e-13 | 4.791e-13 | 5.496e-13 |
| 1.100e-01  | 4.172e-13 | 4.363e-13 | 4.380e-13 | 4.936e-13 | 5.148e-13 | 5.847e-13 |
| 1.150e-01  | 4.574e-13 | 4.757e-13 | 4.744e-13 | 5.303e-13 | 5.487e-13 | 6.176e-13 |
| 1.210e-01  | 5.004e-13 | 5.177e-13 | 5.129e-13 | 5.687e-13 | 5.838e-13 | 6.510e-13 |
| 1.350e-01  | 5.749e-13 | 5.901e-13 | 5.785e-13 | 6.332e-13 | 6.415e-13 | 7.042e-13 |
| 1.490e-01  | 6.727e-13 | 6.839e-13 | 6.620e-13 | 7.132e-13 | 7.105e-13 | 7.640e-13 |
| 1.640e-01  | 7.706e-13 | 7.789e-13 | 7.479e-13 | 7.975e-13 | 7.857e-13 | 8.329e-13 |
| 1.800e-01  | 8.745e-13 | 8.819e-13 | 8.443e-13 | 8.964e-13 | 8.793e-13 | 9.268e-13 |
| 1.980e-01  | 9.804e-13 | 9.865e-13 | 9.416e-13 | 9.957e-13 | 9.724e-13 | 1.019e-12 |
| 2.180e-01  | 1.095e-12 | 1.100e-12 | 1.047e-12 | 1.104e-12 | 1.075e-12 | 1.121e-12 |
| 2.390e-01  | 1.216e-12 | 1.221e-12 | 1.162e-12 | 1.223e-12 | 1.189e-12 | 1.239e-12 |
| 2.630e-01  | 1.340e-12 | 1.345e-12 | 1.278e-12 | 1.344e-12 | 1.305e-12 | 1.356e-12 |
| 2.900e-01  | 1.468e-12 | 1.472e-12 | 1.398e-12 | 1.468e-12 | 1.423e-12 | 1.477e-12 |
| 3.190e-01  | 1.599e-12 | 1.602e-12 | 1.520e-12 | 1.594e-12 | 1.543e-12 | 1.598e-12 |
| 3.510e-01  | 1.743e-12 | 1.746e-12 | 1.656e-12 | 1.736e-12 | 1.680e-12 | 1.738e-12 |
| 3.860e-01  | 1.888e-12 | 1.891e-12 | 1.793e-12 | 1.879e-12 | 1.817e-12 | 1.879e-12 |
| 4.240e-01  | 2.032e-12 | 2.035e-12 | 1.929e-12 | 2.021e-12 | 1.954e-12 | 2.019e-12 |
| 4.670e-01  | 2.192e-12 | 2.195e-12 | 2.081e-12 | 2.179e-12 | 2.106e-12 | 2.176e-12 |
| 5.130e-01  | 2.354e-12 | 2.357e-12 | 2.234e-12 | 2.339e-12 | 2.261e-12 | 2.335e-12 |
| 5.650e-01  | 2.597e-12 | 2.600e-12 | 2.464e-12 | 2.579e-12 | 2.492e-12 | 2.573e-12 |
| 6.210e-01  | 2.869e-12 | 2.871e-12 | 2.721e-12 | 2.848e-12 | 2.752e-12 | 2.841e-12 |
| 6.830e-01  | 3.158e-12 | 3.160e-12 | 2.995e-12 | 3.134e-12 | 3.028e-12 | 3.126e-12 |
| 7.510e-01  | 3.449e-12 | 3.451e-12 | 3.271e-12 | 3.422e-12 | 3.306e-12 | 3.412e-12 |
| 8.260e-01  | 3.731e-12 | 3.734e-12 | 3.538e-12 | 3.702e-12 | 3.575e-12 | 3.690e-12 |
| 9.090e-01  | 4.039e-12 | 4.042e-12 | 3.830e-12 | 4.007e-12 | 3.869e-12 | 3.994e-12 |
| 1.000e+00  | 4.345e-12 | 4.348e-12 | 4.120e-12 | 4.311e-12 | 4.162e-12 | 4.296e-12 |
| 1.120e+00  | 4.757e-12 | 4.760e-12 | 4.510e-12 | 4.719e-12 | 4.556e-12 | 4.703e-12 |
| 1.270e+00  | 5.302e-12 | 5.306e-12 | 5.027e-12 | 5.260e-12 | 5.079e-12 | 5.242e-12 |
| 1.420e+00  | 5.810e-12 | 5.814e-12 | 5.509e-12 | 5.764e-12 | 5.566e-12 | 5.745e-12 |
| 1.600e+00  | 6.276e-12 | 6.281e-12 | 5.953e-12 | 6.229e-12 | 6.015e-12 | 6.209e-12 |
| 1.800e+00  | 6.843e-12 | 6.850e-12 | 6.493e-12 | 6.796e-12 | 6.565e-12 | 6.779e-12 |
| 2.030e+00  | 7.383e-12 | 7.394e-12 | 7.012e-12 | 7.343e-12 | 7.096e-12 | 7.330e-12 |
| 2.280e+00  | 8.063e-12 | 8.080e-12 | 7.668e-12 | 8.034e-12 | 7.769e-12 | 8.030e-12 |
| 2.570e+00  | 8.838e-12 | 8.864e-12 | 8.419e-12 | 8.830e-12 | 8.546e-12 | 8.841e-12 |
| 2.890e+00  | 9.553e-12 | 9.593e-12 | 9.122e-12 | 9.578e-12 | 9.281e-12 | 9.613e-12 |
| 3.250e+00  | 1.024e-11 | 1.030e-11 | 9.810e-12 | 1.031e-11 | 1.001e-11 | 1.038e-11 |
| 3.650e+00  | 1.111e-11 | 1.119e-11 | 1.068e-11 | 1.124e-11 | 1.093e-11 | 1.135e-11 |
| 4.110e+00  | 1.194e-11 | 1.205e-11 | 1.152e-11 | 1.216e-11 | 1.185e-11 | 1.233e-11 |
| 4.620e+00  | 1.294e-11 | 1.310e-11 | 1.255e-11 | 1.328e-11 | 1.297e-11 | 1.353e-11 |
| 5.200e+00  | 1.401e-11 | 1.422e-11 | 1.367e-11 | 1.450e-11 | 1.419e-11 | 1.485e-11 |
| 5.850e+00  | 1.518e-11 | 1.546e-11 | 1.490e-11 | 1.584e-11 | 1.555e-11 | 1.631e-11 |
| 6.580e+00  | 1.649e-11 | 1.684e-11 | 1.628e-11 | 1.736e-11 | 1.709e-11 | 1.797e-11 |
| 7.410e+00  | 1.808e-11 | 1.852e-11 | 1.797e-11 | 1.923e-11 | 1.898e-11 | 2.001e-11 |

KERMA  
Gray cm\*\*2

| Energy-MeV | - N -     | - O -     | - F -     | - Ne -    | - Na -    | - Mg -    |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 8.330e+00  | 1.967e-11 | 2.024e-11 | 1.971e-11 | 2.117e-11 | 2.097e-11 | 2.219e-11 |
| 9.370e+00  | 2.164e-11 | 2.237e-11 | 2.187e-11 | 2.358e-11 | 2.345e-11 | 2.489e-11 |
| 1.060e+01  | 2.390e-11 | 2.482e-11 | 2.438e-11 | 2.639e-11 | 2.635e-11 | 2.807e-11 |
| 1.190e+01  | 2.650e-11 | 2.764e-11 | 2.724e-11 | 2.959e-11 | 2.963e-11 | 3.167e-11 |
| 1.340e+01  | 2.929e-11 | 3.067e-11 | 3.034e-11 | 3.308e-11 | 3.323e-11 | 3.562e-11 |
| 2.000e+01  | 3.739e-11 | 3.960e-11 | 3.959e-11 | 4.357e-11 | 4.414e-11 | 4.767e-11 |
| 3.000e+01  | 5.574e-11 | 5.989e-11 | 6.062e-11 | 6.746e-11 | 6.901e-11 | 7.520e-11 |
| 4.000e+01  | 7.859e-11 | 8.532e-11 | 8.714e-11 | 9.772e-11 | 1.007e-10 | 1.103e-10 |
| 5.000e+01  | 1.028e-10 | 1.123e-10 | 1.154e-10 | 1.300e-10 | 1.344e-10 | 1.479e-10 |
| 7.500e+01  | 1.472e-10 | 1.619e-10 | 1.671e-10 | 1.891e-10 | 1.963e-10 | 2.166e-10 |
| 1.000e+02  | 2.143e-10 | 2.368e-10 | 2.454e-10 | 2.786e-10 | 2.899e-10 | 3.206e-10 |

KERMA  
Gray cm\*\*\*2

| Energy-MeV | -Al-      | -Si-      | - P -     | - S -     | -Cl-      | -Ar-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 1.000e-04  |           |           |           |           |           |           |
| 1.080e-04  | 1.964e-09 | 1.104e-09 | 1.600e-10 | 2.237e-10 | 2.775e-10 | 3.185e-10 |
| 1.140e-04  | 2.027e-09 | 1.462e-09 | 1.558e-10 | 2.201e-10 | 2.756e-10 | 3.204e-10 |
| 1.360e-04  | 2.259e-09 | 1.986e-09 | 3.505e-10 | 2.093e-10 | 2.670e-10 | 3.165e-10 |
| 1.560e-04  | 2.166e-09 | 2.250e-09 | 2.128e-09 | 1.921e-10 | 2.505e-10 | 3.041e-10 |
| 1.700e-04  | 2.058e-09 | 2.342e-09 | 2.192e-09 | 8.276e-10 | 2.364e-10 | 2.953e-10 |
| 1.840e-04  | 1.951e-09 | 2.242e-09 | 2.215e-09 | 2.529e-09 | 2.233e-10 | 2.852e-10 |
| 1.910e-04  | 1.843e-09 | 2.169e-09 | 2.241e-09 | 2.379e-09 | 2.151e-10 | 2.740e-10 |
| 2.140e-04  | 1.698e-09 | 2.053e-09 | 2.352e-09 | 2.299e-09 | 1.046e-09 | 2.557e-10 |
| 2.240e-04  | 1.639e-09 | 1.938e-09 | 2.258e-09 | 2.247e-09 | 2.269e-09 | 2.423e-10 |
| 2.410e-04  | 1.587e-09 | 1.817e-09 | 2.149e-09 | 2.358e-09 | 2.287e-09 | 2.313e-10 |
| 2.470e-04  | 1.531e-09 | 1.724e-09 | 2.061e-09 | 2.376e-09 | 2.209e-09 | 4.164e-10 |
| 2.630e-04  | 1.463e-09 | 1.674e-09 | 2.004e-09 | 2.328e-09 | 2.168e-09 | 2.825e-09 |
| 2.750e-04  | 1.362e-09 | 1.596e-09 | 1.916e-09 | 2.248e-09 | 2.194e-09 | 2.583e-09 |
| 2.820e-04  | 1.282e-09 | 1.533e-09 | 1.844e-09 | 2.182e-09 | 2.290e-09 | 2.284e-09 |
| 2.960e-04  | 1.183e-09 | 1.454e-09 | 1.752e-09 | 2.096e-09 | 2.237e-09 | 2.189e-09 |
| 3.180e-04  | 1.060e-09 | 1.347e-09 | 1.629e-09 | 1.977e-09 | 2.153e-09 | 2.100e-09 |
| 3.550e-04  | 9.860e-10 | 1.257e-09 | 1.524e-09 | 1.857e-09 | 2.038e-09 | 2.174e-09 |
| 3.610e-04  | 9.184e-10 | 1.172e-09 | 1.424e-09 | 1.743e-09 | 1.925e-09 | 2.096e-09 |
| 3.700e-04  | 8.903e-10 | 1.137e-09 | 1.383e-09 | 1.696e-09 | 1.877e-09 | 2.057e-09 |
| 3.830e-04  | 8.456e-10 | 1.082e-09 | 1.317e-09 | 1.619e-09 | 1.800e-09 | 1.994e-09 |
| 4.030e-04  | 7.714e-10 | 9.889e-10 | 1.208e-09 | 1.492e-09 | 1.672e-09 | 1.886e-09 |
| 4.150e-04  | 7.248e-10 | 9.308e-10 | 1.139e-09 | 1.411e-09 | 1.588e-09 | 1.810e-09 |
| 4.300e-04  | 7.048e-10 | 9.063e-10 | 1.109e-09 | 1.375e-09 | 1.550e-09 | 1.766e-09 |
| 4.500e-04  | 6.747e-10 | 8.691e-10 | 1.064e-09 | 1.320e-09 | 1.491e-09 | 1.700e-09 |
| 4.810e-04  | 6.222e-10 | 8.040e-10 | 9.856e-10 | 1.224e-09 | 1.387e-09 | 1.582e-09 |
| 5.160e-04  | 5.469e-10 | 7.102e-10 | 8.722e-10 | 1.084e-09 | 1.237e-09 | 1.412e-09 |
| 5.470e-04  | 5.052e-10 | 6.569e-10 | 8.073e-10 | 1.006e-09 | 1.150e-09 | 1.313e-09 |
| 5.550e-04  | 4.825e-10 | 6.275e-10 | 7.715e-10 | 9.625e-10 | 1.101e-09 | 1.258e-09 |
| 5.930e-04  | 4.513e-10 | 5.869e-10 | 7.220e-10 | 9.025e-10 | 1.034e-09 | 1.182e-09 |
| 5.980e-04  | 4.192e-10 | 5.453e-10 | 6.712e-10 | 8.409e-10 | 9.644e-10 | 1.103e-09 |
| 6.250e-04  | 4.042e-10 | 5.260e-10 | 6.477e-10 | 8.120e-10 | 9.319e-10 | 1.066e-09 |
| 6.540e-04  | 3.829e-10 | 4.989e-10 | 6.148e-10 | 7.709e-10 | 8.857e-10 | 1.014e-09 |
| 6.750e-04  | 3.611e-10 | 4.712e-10 | 5.810e-10 | 7.287e-10 | 8.382e-10 | 9.596e-10 |
| 6.980e-04  | 3.396e-10 | 4.437e-10 | 5.475e-10 | 6.869e-10 | 7.911e-10 | 9.060e-10 |
| 7.110e-04  | 3.233e-10 | 4.229e-10 | 5.222e-10 | 6.552e-10 | 7.555e-10 | 8.653e-10 |
| 7.250e-04  | 3.164e-10 | 4.139e-10 | 5.112e-10 | 6.417e-10 | 7.402e-10 | 8.477e-10 |
| 7.710e-04  | 2.992e-10 | 3.916e-10 | 4.840e-10 | 6.079e-10 | 7.022e-10 | 8.040e-10 |
| 7.940e-04  | 2.769e-10 | 3.626e-10 | 4.486e-10 | 5.640e-10 | 6.528e-10 | 7.470e-10 |
| 8.180e-04  | 2.624e-10 | 3.437e-10 | 4.254e-10 | 5.354e-10 | 6.203e-10 | 7.098e-10 |
| 8.380e-04  | 2.535e-10 | 3.323e-10 | 4.111e-10 | 5.176e-10 | 5.999e-10 | 6.866e-10 |
| 8.600e-04  | 2.445e-10 | 3.207e-10 | 3.965e-10 | 4.996e-10 | 5.792e-10 | 6.631e-10 |
| 8.980e-04  | 2.302e-10 | 3.023e-10 | 3.734e-10 | 4.711e-10 | 5.464e-10 | 6.259e-10 |
| 9.200e-04  | 2.171e-10 | 2.862e-10 | 3.537e-10 | 4.467e-10 | 5.158e-10 | 5.926e-10 |
| 9.400e-04  | 2.112e-10 | 2.804e-10 | 3.478e-10 | 4.391e-10 | 5.013e-10 | 5.798e-10 |
| 9.560e-04  | 2.058e-10 | 2.750e-10 | 3.422e-10 | 4.321e-10 | 4.879e-10 | 5.678e-10 |

KEKMA  
Gray cm\*\*2

| Energy-MeV | -Al-      | -Si-      | - P -     | - S -     | -Cl-      | -Ar-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.800e-04  | 1.994e-10 | 2.686e-10 | 3.355e-10 | 4.235e-10 | 4.720e-10 | 5.535e-10 |
| 9.900e-04  | 1.936e-10 | 2.627e-10 | 3.294e-10 | 4.157e-10 | 4.577e-10 | 5.406e-10 |
| 1.000e-03  | 1.900e-10 | 2.591e-10 | 3.256e-10 | 4.109e-10 | 4.489e-10 | 5.325e-10 |
| 1.080e-03  | 1.852e-10 | 2.531e-10 | 3.180e-10 | 4.019e-10 | 4.382e-10 | 5.202e-10 |
| 1.140e-03  | 1.782e-10 | 2.438e-10 | 3.053e-10 | 3.870e-10 | 4.237e-10 | 5.012e-10 |
| 1.360e-03  | 1.559e-10 | 2.135e-10 | 2.650e-10 | 3.389e-10 | 3.756e-10 | 4.397e-10 |
| 1.560e-03  | 1.100e-10 | 1.485e-10 | 1.795e-10 | 2.359e-10 | 2.708e-10 | 3.075e-10 |
| 1.700e-03  | 1.025e-09 | 1.187e-10 | 1.447e-10 | 1.919e-10 | 2.245e-10 | 2.511e-10 |
| 1.840e-03  | 9.389e-10 | 1.122e-10 | 1.299e-10 | 1.712e-10 | 2.010e-10 | 2.245e-10 |
| 1.910e-03  | 8.568e-10 | 9.561e-10 | 1.162e-10 | 1.519e-10 | 1.793e-10 | 1.997e-10 |
| 2.140e-03  | 7.499e-10 | 8.783e-10 | 9.661e-11 | 1.260e-10 | 1.509e-10 | 1.682e-10 |
| 2.240e-03  | 7.081e-10 | 8.394e-10 | 7.859e-10 | 1.117e-10 | 1.388e-10 | 1.570e-10 |
| 2.410e-03  | 6.761e-10 | 8.039e-10 | 8.221e-10 | 9.996e-11 | 1.297e-10 | 1.492e-10 |
| 2.470e-03  | 6.427e-10 | 7.667e-10 | 7.903e-10 | 8.846e-11 | 1.204e-10 | 1.411e-10 |
| 2.630e-03  | 6.039e-10 | 7.231e-10 | 7.525e-10 | 8.465e-10 | 1.100e-10 | 1.319e-10 |
| 2.750e-03  | 5.469e-10 | 6.590e-10 | 6.961e-10 | 8.031e-10 | 9.493e-11 | 1.183e-10 |
| 2.820e-03  | 5.029e-10 | 6.093e-10 | 6.521e-10 | 7.628e-10 | 8.345e-11 | 1.078e-10 |
| 2.960e-03  | 4.488e-10 | 5.480e-10 | 5.974e-10 | 7.123e-10 | 7.187e-10 | 9.501e-11 |
| 3.180e-03  | 3.826e-10 | 4.727e-10 | 5.287e-10 | 6.455e-10 | 6.789e-10 | 7.781e-11 |
| 3.550e-03  | 3.473e-10 | 4.311e-10 | 4.843e-10 | 5.904e-10 | 6.268e-10 | 6.409e-10 |
| 3.610e-03  | 3.164e-10 | 3.943e-10 | 4.446e-10 | 5.407e-10 | 5.787e-10 | 6.309e-10 |
| 3.700e-03  | 3.038e-10 | 3.793e-10 | 4.284e-10 | 5.204e-10 | 5.588e-10 | 6.114e-10 |
| 3.830e-03  | 2.839e-10 | 3.555e-10 | 4.026e-10 | 4.882e-10 | 5.274e-10 | 5.803e-10 |
| 4.030e-03  | 2.512e-10 | 3.163e-10 | 3.601e-10 | 4.352e-10 | 4.754e-10 | 5.287e-10 |
| 4.150e-03  | 2.310e-10 | 2.921e-10 | 3.338e-10 | 4.024e-10 | 4.430e-10 | 4.953e-10 |
| 4.300e-03  | 2.230e-10 | 2.823e-10 | 3.229e-10 | 3.891e-10 | 4.294e-10 | 4.797e-10 |
| 4.500e-03  | 2.110e-10 | 2.676e-10 | 3.067e-10 | 3.693e-10 | 4.091e-10 | 4.565e-10 |
| 4.810e-03  | 1.906e-10 | 2.425e-10 | 2.788e-10 | 3.351e-10 | 3.739e-10 | 4.163e-10 |
| 5.160e-03  | 1.616e-10 | 2.068e-10 | 2.391e-10 | 2.867e-10 | 3.237e-10 | 3.592e-10 |
| 5.470e-03  | 1.459e-10 | 1.872e-10 | 2.172e-10 | 2.603e-10 | 2.957e-10 | 3.274e-10 |
| 5.550e-03  | 1.376e-10 | 1.768e-10 | 2.054e-10 | 2.461e-10 | 2.805e-10 | 3.103e-10 |
| 5.930e-03  | 1.262e-10 | 1.626e-10 | 1.893e-10 | 2.267e-10 | 2.597e-10 | 2.868e-10 |
| 5.980e-03  | 1.147e-10 | 1.481e-10 | 1.729e-10 | 2.070e-10 | 2.384e-10 | 2.629e-10 |
| 6.250e-03  | 1.105e-10 | 1.428e-10 | 1.669e-10 | 1.998e-10 | 2.306e-10 | 2.541e-10 |
| 6.540e-03  | 1.060e-10 | 1.371e-10 | 1.604e-10 | 1.920e-10 | 2.220e-10 | 2.445e-10 |
| 6.750e-03  | 1.013e-10 | 1.311e-10 | 1.536e-10 | 1.839e-10 | 2.130e-10 | 2.344e-10 |
| 6.980e-03  | 9.660e-11 | 1.251e-10 | 1.467e-10 | 1.757e-10 | 2.039e-10 | 2.243e-10 |
| 7.110e-03  | 9.240e-11 | 1.198e-10 | 1.406e-10 | 1.684e-10 | 1.957e-10 | 2.152e-10 |
| 7.250e-03  | 8.901e-11 | 1.154e-10 | 1.356e-10 | 1.624e-10 | 1.891e-10 | 2.079e-10 |
| 7.710e-03  | 8.069e-11 | 1.048e-10 | 1.234e-10 | 1.479e-10 | 1.729e-10 | 1.898e-10 |
| 7.940e-03  | 7.011e-11 | 9.131e-11 | 1.079e-10 | 1.293e-10 | 1.522e-10 | 1.668e-10 |
| 8.180e-03  | 6.398e-11 | 8.346e-11 | 9.891e-11 | 1.186e-10 | 1.401e-10 | 1.534e-10 |
| 8.380e-03  | 6.196e-11 | 8.085e-11 | 9.588e-11 | 1.150e-10 | 1.360e-10 | 1.489e-10 |
| 8.600e-03  | 6.004e-11 | 7.837e-11 | 9.300e-11 | 1.116e-10 | 1.320e-10 | 1.445e-10 |
| 8.980e-03  | 5.698e-11 | 7.441e-11 | 8.839e-11 | 1.061e-10 | 1.258e-10 | 1.376e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -Al-      | -Si-      | - P-      | - S-      | -Cl-      | -Ar-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.200e-03  | 5.360e-11 | 7.004e-11 | 8.330e-11 | 1.000e-10 | 1.188e-10 | 1.299e-10 |
| 9.400e-03  | 5.102e-11 | 6.670e-11 | 7.940e-11 | 9.539e-11 | 1.135e-10 | 1.240e-10 |
| 9.560e-03  | 4.867e-11 | 6.366e-11 | 7.585e-11 | 9.117e-11 | 1.086e-10 | 1.187e-10 |
| 9.800e-03  | 4.590e-11 | 6.007e-11 | 7.167e-11 | 8.620e-11 | 1.029e-10 | 1.123e-10 |
| 1.000e-02  | 4.268e-11 | 5.590e-11 | 6.681e-11 | 8.041e-11 | 9.620e-11 | 1.050e-10 |
| 1.040e-02  | 4.079e-11 | 5.344e-11 | 6.393e-11 | 7.699e-11 | 9.225e-11 | 1.006e-10 |
| 1.080e-02  | 3.990e-11 | 5.229e-11 | 6.258e-11 | 7.539e-11 | 9.037e-11 | 9.857e-11 |
| 1.110e-02  | 3.898e-11 | 5.109e-11 | 6.116e-11 | 7.371e-11 | 8.839e-11 | 9.641e-11 |
| 1.190e-02  | 3.722e-11 | 4.878e-11 | 5.843e-11 | 7.047e-11 | 8.456e-11 | 9.223e-11 |
| 1.270e-02  | 3.405e-11 | 4.464e-11 | 5.354e-11 | 6.466e-11 | 7.769e-11 | 8.471e-11 |
| 1.300e-02  | 3.147e-11 | 4.127e-11 | 4.954e-11 | 5.990e-11 | 7.206e-11 | 7.855e-11 |
| 1.390e-02  | 2.819e-11 | 3.697e-11 | 4.445e-11 | 5.383e-11 | 6.489e-11 | 7.071e-11 |
| 1.470e-02  | 2.287e-11 | 3.001e-11 | 3.621e-11 | 4.401e-11 | 5.325e-11 | 5.798e-11 |
| 1.520e-02  | 1.852e-11 | 2.432e-11 | 2.945e-11 | 3.596e-11 | 4.370e-11 | 4.754e-11 |
| 1.570e-02  | 1.744e-11 | 2.290e-11 | 2.776e-11 | 3.394e-11 | 4.129e-11 | 4.492e-11 |
| 1.640e-02  | 1.675e-11 | 2.200e-11 | 2.669e-11 | 3.265e-11 | 3.973e-11 | 4.322e-11 |
| 1.700e-02  | 1.591e-11 | 2.088e-11 | 2.535e-11 | 3.104e-11 | 3.779e-11 | 4.111e-11 |
| 1.720e-02  | 1.533e-11 | 2.012e-11 | 2.443e-11 | 2.994e-11 | 3.646e-11 | 3.966e-11 |
| 1.810e-02  | 1.444e-11 | 1.896e-11 | 2.303e-11 | 2.826e-11 | 3.443e-11 | 3.745e-11 |
| 1.900e-02  | 1.283e-11 | 1.683e-11 | 2.048e-11 | 2.519e-11 | 3.071e-11 | 3.341e-11 |
| 1.970e-02  | 1.121e-11 | 1.470e-11 | 1.791e-11 | 2.210e-11 | 2.697e-11 | 2.933e-11 |
| 2.010e-02  | 1.001e-11 | 1.313e-11 | 1.602e-11 | 1.983e-11 | 2.422e-11 | 2.634e-11 |
| 2.100e-02  | 9.629e-12 | 1.262e-11 | 1.541e-11 | 1.909e-11 | 2.332e-11 | 2.537e-11 |
| 2.170e-02  | 9.407e-12 | 1.233e-11 | 1.505e-11 | 1.866e-11 | 2.279e-11 | 2.479e-11 |
| 2.230e-02  | 9.194e-12 | 1.204e-11 | 1.471e-11 | 1.824e-11 | 2.228e-11 | 2.424e-11 |
| 2.310e-02  | 8.929e-12 | 1.169e-11 | 1.428e-11 | 1.773e-11 | 2.165e-11 | 2.356e-11 |
| 2.550e-02  | 8.183e-12 | 1.071e-11 | 1.309e-11 | 1.627e-11 | 1.987e-11 | 2.162e-11 |
| 2.920e-02  | 6.269e-12 | 8.185e-12 | 1.002e-11 | 1.253e-11 | 1.529e-11 | 1.665e-11 |
| 3.320e-02  | 4.054e-12 | 5.263e-12 | 6.461e-12 | 8.181e-12 | 9.967e-12 | 1.086e-11 |
| 3.750e-02  | 3.336e-12 | 4.317e-12 | 5.298e-12 | 6.737e-12 | 8.189e-12 | 8.932e-12 |
| 4.200e-02  | 2.437e-12 | 3.133e-12 | 3.841e-12 | 4.920e-12 | 5.955e-12 | 6.504e-12 |
| 4.740e-02  | 1.973e-12 | 2.520e-12 | 3.083e-12 | 3.964e-12 | 4.777e-12 | 5.220e-12 |
| 4.850e-02  | 1.695e-12 | 2.155e-12 | 2.629e-12 | 3.389e-12 | 4.068e-12 | 4.446e-12 |
| 5.020e-02  | 1.556e-12 | 1.971e-12 | 2.401e-12 | 3.099e-12 | 3.712e-12 | 4.057e-12 |
| 5.500e-02  | 1.403e-12 | 1.768e-12 | 2.148e-12 | 2.774e-12 | 3.311e-12 | 3.618e-12 |
| 6.100e-02  | 1.184e-12 | 1.479e-12 | 1.785e-12 | 2.304e-12 | 2.731e-12 | 2.983e-12 |
| 6.750e-02  | 1.039e-12 | 1.285e-12 | 1.539e-12 | 1.982e-12 | 2.333e-12 | 2.544e-12 |
| 6.950e-02  | 9.796e-13 | 1.205e-12 | 1.436e-12 | 1.844e-12 | 2.161e-12 | 2.354e-12 |
| 7.350e-02  | 9.266e-13 | 1.133e-12 | 1.345e-12 | 1.724e-12 | 2.012e-12 | 2.189e-12 |
| 7.840e-02  | 8.333e-13 | 1.009e-12 | 1.187e-12 | 1.514e-12 | 1.753e-12 | 1.903e-12 |
| 8.070e-02  | 7.482e-13 | 8.958e-13 | 1.043e-12 | 1.324e-12 | 1.520e-12 | 1.645e-12 |
| 8.550e-02  | 7.228e-13 | 8.603e-13 | 9.963e-13 | 1.259e-12 | 1.438e-12 | 1.554e-12 |
| 8.800e-02  | 7.064e-13 | 8.364e-13 | 9.634e-13 | 1.213e-12 | 1.379e-12 | 1.487e-12 |
| 9.050e-02  | 6.925e-13 | 8.167e-13 | 9.369e-13 | 1.176e-12 | 1.332e-12 | 1.434e-12 |
| 9.230e-02  | 6.791e-13 | 7.978e-13 | 9.117e-13 | 1.140e-12 | 1.288e-12 | 1.385e-12 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -Al-      | -Si-      | - Fe -    | - S -     | -Cl-      | -Ar-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 9.600e-02  | 6.596e-13 | 7.707e-13 | 8.758e-13 | 1.090e-12 | 1.226e-12 | 1.315e-12 |
| 1.000e-01  | 6.284e-13 | 7.278e-13 | 8.195e-13 | 1.012e-12 | 1.129e-12 | 1.206e-12 |
| 1.050e-01  | 6.274e-13 | 7.200e-13 | 8.024e-13 | 9.818e-13 | 1.086e-12 | 1.154e-12 |
| 1.100e-01  | 6.590e-13 | 7.505e-13 | 8.290e-13 | 1.005e-12 | 1.104e-12 | 1.167e-12 |
| 1.150e-01  | 6.878e-13 | 7.776e-13 | 8.515e-13 | 1.023e-12 | 1.115e-12 | 1.173e-12 |
| 1.210e-01  | 7.160e-13 | 8.032e-13 | 8.714e-13 | 1.036e-12 | 1.121e-12 | 1.173e-12 |
| 1.350e-01  | 7.576e-13 | 8.383e-13 | 8.938e-13 | 1.043e-12 | 1.111e-12 | 1.148e-12 |
| 1.490e-01  | 7.977e-13 | 8.651e-13 | 8.989e-13 | 1.018e-12 | 1.057e-12 | 1.072e-12 |
| 1.640e-01  | 8.508e-13 | 9.091e-13 | 9.257e-13 | 1.022e-12 | 1.038e-12 | 1.034e-12 |
| 1.800e-01  | 9.379e-13 | 9.958e-13 | 1.005e-12 | 1.096e-12 | 1.102e-12 | 1.088e-12 |
| 1.980e-01  | 1.021e-12 | 1.077e-12 | 1.077e-12 | 1.158e-12 | 1.152e-12 | 1.125e-12 |
| 2.180e-01  | 1.116e-12 | 1.171e-12 | 1.161e-12 | 1.236e-12 | 1.218e-12 | 1.179e-12 |
| 2.390e-01  | 1.229e-12 | 1.286e-12 | 1.272e-12 | 1.347e-12 | 1.323e-12 | 1.275e-12 |
| 2.630e-01  | 1.341e-12 | 1.401e-12 | 1.381e-12 | 1.456e-12 | 1.423e-12 | 1.366e-12 |
| 2.900e-01  | 1.455e-12 | 1.516e-12 | 1.489e-12 | 1.560e-12 | 1.518e-12 | 1.450e-12 |
| 3.190e-01  | 1.570e-12 | 1.632e-12 | 1.597e-12 | 1.664e-12 | 1.613e-12 | 1.532e-12 |
| 3.510e-01  | 1.705e-12 | 1.772e-12 | 1.731e-12 | 1.800e-12 | 1.742e-12 | 1.652e-12 |
| 3.860e-01  | 1.841e-12 | 1.911e-12 | 1.866e-12 | 1.936e-12 | 1.870e-12 | 1.770e-12 |
| 4.240e-01  | 1.977e-12 | 2.050e-12 | 1.999e-12 | 2.070e-12 | 1.997e-12 | 1.887e-12 |
| 4.670e-01  | 2.129e-12 | 2.207e-12 | 2.151e-12 | 2.225e-12 | 2.145e-12 | 2.024e-12 |
| 5.130e-01  | 2.283e-12 | 2.366e-12 | 2.304e-12 | 2.381e-12 | 2.294e-12 | 2.163e-12 |
| 5.650e-01  | 2.515e-12 | 2.606e-12 | 2.536e-12 | 2.619e-12 | 2.522e-12 | 2.376e-12 |
| 6.210e-01  | 2.775e-12 | 2.874e-12 | 2.797e-12 | 2.887e-12 | 2.778e-12 | 2.616e-12 |
| 6.830e-01  | 3.053e-12 | 3.161e-12 | 3.075e-12 | 3.173e-12 | 3.053e-12 | 2.873e-12 |
| 7.510e-01  | 3.332e-12 | 3.450e-12 | 3.355e-12 | 3.461e-12 | 3.329e-12 | 3.133e-12 |
| 8.260e-01  | 3.603e-12 | 3.730e-12 | 3.626e-12 | 3.740e-12 | 3.596e-12 | 3.383e-12 |
| 9.090e-01  | 3.899e-12 | 4.036e-12 | 3.923e-12 | 4.045e-12 | 3.890e-12 | 3.659e-12 |
| 1.000e+00  | 4.194e-12 | 4.341e-12 | 4.219e-12 | 4.350e-12 | 4.182e-12 | 3.933e-12 |
| 1.120e+00  | 4.590e-12 | 4.751e-12 | 4.617e-12 | 4.760e-12 | 4.576e-12 | 4.302e-12 |
| 1.270e+00  | 5.117e-12 | 5.295e-12 | 5.146e-12 | 5.305e-12 | 5.100e-12 | 4.795e-12 |
| 1.420e+00  | 5.608e-12 | 5.804e-12 | 5.640e-12 | 5.815e-12 | 5.589e-12 | 5.255e-12 |
| 1.600e+00  | 6.061e-12 | 6.274e-12 | 6.097e-12 | 6.286e-12 | 6.043e-12 | 5.682e-12 |
| 1.800e+00  | 6.619e-12 | 6.853e-12 | 6.662e-12 | 6.871e-12 | 6.606e-12 | 6.213e-12 |
| 2.030e+00  | 7.161e-12 | 7.417e-12 | 7.213e-12 | 7.442e-12 | 7.159e-12 | 6.735e-12 |
| 2.280e+00  | 7.850e-12 | 8.135e-12 | 7.917e-12 | 8.173e-12 | 7.867e-12 | 7.405e-12 |
| 2.570e+00  | 8.649e-12 | 8.972e-12 | 8.738e-12 | 9.029e-12 | 8.698e-12 | 8.195e-12 |
| 2.890e+00  | 9.415e-12 | 9.777e-12 | 9.533e-12 | 9.861e-12 | 9.511e-12 | 8.970e-12 |
| 3.250e+00  | 1.019e-11 | 1.059e-11 | 1.034e-11 | 1.071e-11 | 1.034e-11 | 9.771e-12 |
| 3.650e+00  | 1.116e-11 | 1.162e-11 | 1.136e-11 | 1.179e-11 | 1.140e-11 | 1.078e-11 |
| 4.110e+00  | 1.214e-11 | 1.267e-11 | 1.241e-11 | 1.290e-11 | 1.250e-11 | 1.185e-11 |
| 4.620e+00  | 1.335e-11 | 1.396e-11 | 1.371e-11 | 1.428e-11 | 1.386e-11 | 1.316e-11 |
| 5.200e+00  | 1.468e-11 | 1.540e-11 | 1.515e-11 | 1.582e-11 | 1.540e-11 | 1.465e-11 |
| 5.850e+00  | 1.617e-11 | 1.699e-11 | 1.677e-11 | 1.754e-11 | 1.711e-11 | 1.632e-11 |
| 6.580e+00  | 1.786e-11 | 1.882e-11 | 1.861e-11 | 1.952e-11 | 1.908e-11 | 1.823e-11 |
| 7.410e+00  | 1.995e-11 | 2.107e-11 | 2.089e-11 | 2.196e-11 | 2.152e-11 | 2.061e-11 |

**KERMA**  
**Gray cm\*\*2**

| <b>Energy-MeV</b> | <b>-Al-</b> | <b>-Si-</b> | <b>- P-</b> | <b>- S-</b> | <b>-Cl-</b> | <b>-Ar-</b> |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 8.330e+00         | 2.219e-11   | 2.351e-11   | 2.337e-11   | 2.464e-11   | 2.420e-11   | 2.324e-11   |
| 9.370e+00         | 2.497e-11   | 2.653e-11   | 2.646e-11   | 2.797e-11   | 2.754e-11   | 2.651e-11   |
| 1.060e+01         | 2.826e-11   | 3.013e-11   | 3.013e-11   | 3.194e-11   | 3.154e-11   | 3.044e-11   |
| 1.190e+01         | 3.196e-11   | 3.416e-11   | 3.425e-11   | 3.639e-11   | 3.601e-11   | 3.482e-11   |
| 1.340e+01         | 3.605e-11   | 3.863e-11   | 3.883e-11   | 4.135e-11   | 4.100e-11   | 3.972e-11   |
| 2.000e+01         | 4.859e-11   | 5.243e-11   | 5.302e-11   | 5.679e-11   | 5.662e-11   | 5.513e-11   |
| 3.000e+01         | 7.726e-11   | 8.397e-11   | 8.550e-11   | 9.214e-11   | 9.239e-11   | 9.043e-11   |
| 4.000e+01         | 1.139e-10   | 1.244e-10   | 1.272e-10   | 1.376e-10   | 1.385e-10   | 1.360e-10   |
| 5.000e+01         | 1.532e-10   | 1.677e-10   | 1.719e-10   | 1.863e-10   | 1.878e-10   | 1.846e-10   |
| 7.500e+01         | 2.250e-10   | 2.469e-10   | 2.536e-10   | 2.754e-10   | 2.780e-10   | 2.738e-10   |
| 1.000e+02         | 3.337e-10   | 3.668e-10   | 3.773e-10   | 4.103e-10   | 4.146e-10   | 4.088e-10   |

KERMA  
Gray cm\*\*2

| Energy-MeV | -K-       | -Ca-      | -Se-      | -Ti-      | - V-      | -Cr-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 1.000e-04  |           |           |           |           |           |           |
| 1.080e-04  | 3.523e-10 | 3.812e-10 | 4.305e-10 | 4.768e-10 | 5.339e-10 | 7.050e-10 |
| 1.140e-04  | 3.583e-10 | 3.897e-10 | 4.386e-10 | 4.842e-10 | 5.411e-10 | 7.111e-10 |
| 1.360e-04  | 3.627e-10 | 3.993e-10 | 4.456e-10 | 4.884e-10 | 5.430e-10 | 7.053e-10 |
| 1.560e-04  | 3.551e-10 | 3.996e-10 | 4.391e-10 | 4.750e-10 | 5.230e-10 | 6.640e-10 |
| 1.700e-04  | 3.482e-10 | 3.962e-10 | 4.331e-10 | 4.667e-10 | 5.119e-10 | 6.421e-10 |
| 1.840e-04  | 3.397e-10 | 3.893e-10 | 4.249e-10 | 4.579e-10 | 5.014e-10 | 6.247e-10 |
| 1.910e-04  | 3.296e-10 | 3.800e-10 | 4.143e-10 | 4.465e-10 | 4.882e-10 | 6.044e-10 |
| 2.140e-04  | 3.150e-10 | 3.664e-10 | 3.989e-10 | 4.300e-10 | 4.694e-10 | 5.762e-10 |
| 2.240e-04  | 3.093e-10 | 3.620e-10 | 3.942e-10 | 4.253e-10 | 4.640e-10 | 5.674e-10 |
| 2.410e-04  | 3.031e-10 | 3.567e-10 | 3.885e-10 | 4.194e-10 | 4.578e-10 | 5.582e-10 |
| 2.470e-04  | 2.958e-10 | 3.499e-10 | 3.812e-10 | 4.119e-10 | 4.496e-10 | 5.468e-10 |
| 2.630e-04  | 2.866e-10 | 3.410e-10 | 3.716e-10 | 4.018e-10 | 4.387e-10 | 5.319e-10 |
| 2.750e-04  | 2.723e-10 | 3.268e-10 | 3.563e-10 | 3.858e-10 | 4.212e-10 | 5.085e-10 |
| 2.820e-04  | 2.608e-10 | 3.152e-10 | 3.438e-10 | 3.726e-10 | 4.069e-10 | 4.895e-10 |
| 2.960e-04  | 3.915e-10 | 3.004e-10 | 3.278e-10 | 3.558e-10 | 3.886e-10 | 4.653e-10 |
| 3.180e-04  | 2.886e-09 | 2.798e-10 | 3.075e-10 | 3.344e-10 | 3.654e-10 | 4.348e-10 |
| 3.550e-04  | 2.282e-09 | 6.441e-10 | 2.937e-10 | 3.199e-10 | 3.500e-10 | 4.152e-10 |
| 3.610e-04  | 2.139e-09 | 2.230e-09 | 2.801e-10 | 3.056e-10 | 3.346e-10 | 3.958e-10 |
| 3.700e-04  | 2.091e-09 | 2.267e-09 | 2.742e-10 | 2.994e-10 | 3.279e-10 | 3.875e-10 |
| 3.830e-04  | 2.130e-09 | 2.264e-09 | 2.648e-10 | 2.893e-10 | 3.171e-10 | 3.741e-10 |
| 4.030e-04  | 2.210e-09 | 2.191e-09 | 2.487e-10 | 2.723e-10 | 2.988e-10 | 3.514e-10 |
| 4.150e-04  | 2.164e-09 | 2.112e-09 | 1.757e-09 | 2.602e-10 | 2.858e-10 | 3.371e-10 |
| 4.300e-04  | 2.117e-09 | 2.037e-09 | 2.140e-09 | 2.534e-10 | 2.783e-10 | 3.308e-10 |
| 4.500e-04  | 2.045e-09 | 2.113e-09 | 2.083e-09 | 2.431e-10 | 2.671e-10 | 3.211e-10 |
| 4.810e-04  | 1.916e-09 | 2.112e-09 | 1.952e-09 | 1.386e-09 | 2.523e-10 | 3.034e-10 |
| 5.160e-04  | 1.728e-09 | 1.946e-09 | 1.918e-09 | 1.947e-09 | 2.534e-10 | 2.771e-10 |
| 5.470e-04  | 1.613e-09 | 1.832e-09 | 1.936e-09 | 1.818e-09 | 1.478e-09 | 2.597e-10 |
| 5.550e-04  | 1.548e-09 | 1.764e-09 | 1.848e-09 | 1.735e-09 | 1.726e-09 | 2.494e-10 |
| 5.930e-04  | 1.456e-09 | 1.667e-09 | 1.757e-09 | 1.846e-09 | 1.790e-09 | 8.883e-10 |
| 5.980e-04  | 1.363e-09 | 1.568e-09 | 1.679e-09 | 1.821e-09 | 1.712e-09 | 2.023e-09 |
| 6.250e-04  | 1.319e-09 | 1.521e-09 | 1.635e-09 | 1.774e-09 | 1.652e-09 | 2.002e-09 |
| 6.540e-04  | 1.257e-09 | 1.454e-09 | 1.563e-09 | 1.700e-09 | 1.789e-09 | 1.881e-09 |
| 6.750e-04  | 1.192e-09 | 1.384e-09 | 1.488e-09 | 1.623e-09 | 1.742e-09 | 1.758e-09 |
| 6.980e-04  | 1.129e-09 | 1.315e-09 | 1.413e-09 | 1.546e-09 | 1.667e-09 | 1.708e-09 |
| 7.110e-04  | 1.080e-09 | 1.261e-09 | 1.356e-09 | 1.486e-09 | 1.609e-09 | 1.857e-09 |
| 7.250e-04  | 1.059e-09 | 1.237e-09 | 1.331e-09 | 1.459e-09 | 1.581e-09 | 1.818e-09 |
| 7.710e-04  | 1.005e-09 | 1.176e-09 | 1.267e-09 | 1.390e-09 | 1.510e-09 | 1.723e-09 |
| 7.940e-04  | 9.356e-10 | 1.096e-09 | 1.184e-09 | 1.300e-09 | 1.416e-09 | 1.625e-09 |
| 8.180e-04  | 8.899e-10 | 1.044e-09 | 1.129e-09 | 1.241e-09 | 1.355e-09 | 1.563e-09 |
| 8.380e-04  | 8.612e-10 | 1.011e-09 | 1.094e-09 | 1.204e-09 | 1.316e-09 | 1.520e-09 |
| 8.600e-04  | 8.320e-10 | 9.775e-10 | 1.058e-09 | 1.167e-09 | 1.277e-09 | 1.476e-09 |
| 8.980e-04  | 7.856e-10 | 9.242e-10 | 1.001e-09 | 1.107e-09 | 1.214e-09 | 1.405e-09 |
| 9.200e-04  | 7.435e-10 | 8.773e-10 | 9.505e-10 | 1.058e-09 | 1.160e-09 | 1.344e-09 |
| 9.400e-04  | 7.254e-10 | 8.604e-10 | 9.314e-10 | 1.045e-09 | 1.144e-09 | 1.327e-09 |
| 9.560e-04  | 7.088e-10 | 8.447e-10 | 9.137e-10 | 1.033e-09 | 1.129e-09 | 1.310e-09 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -K-       | -Ca-      | -Sc-      | -Ti-      | - V-      | -Cr-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.800e-04  | 6.889e-10 | 8.257e-10 | 8.923e-10 | 1.019e-09 | 1.110e-09 | 1.290e-09 |
| 9.900e-04  | 6.709e-10 | 8.086e-10 | 8.729e-10 | 1.005e-09 | 1.094e-09 | 1.271e-09 |
| 1.000e-03  | 6.598e-10 | 7.979e-10 | 8.609e-10 | 9.966e-10 | 1.083e-09 | 1.260e-09 |
| 1.080e-03  | 6.446e-10 | 7.808e-10 | 8.433e-10 | 9.777e-10 | 1.062e-09 | 1.236e-09 |
| 1.140e-03  | 6.223e-10 | 7.536e-10 | 8.162e-10 | 9.439e-10 | 1.026e-09 | 1.194e-09 |
| 1.360e-03  | 5.491e-10 | 6.646e-10 | 7.254e-10 | 8.332e-10 | 9.082e-10 | 1.055e-09 |
| 1.560e-03  | 3.907e-10 | 4.721e-10 | 5.270e-10 | 5.934e-10 | 6.515e-10 | 7.541e-10 |
| 1.700e-03  | 3.223e-10 | 3.891e-10 | 4.396e-10 | 4.899e-10 | 5.401e-10 | 6.240e-10 |
| 1.840e-03  | 2.892e-10 | 3.491e-10 | 3.958e-10 | 4.399e-10 | 4.858e-10 | 5.607e-10 |
| 1.910e-03  | 2.584e-10 | 3.118e-10 | 3.548e-10 | 3.934e-10 | 4.350e-10 | 5.018e-10 |
| 2.140e-03  | 2.191e-10 | 2.643e-10 | 3.023e-10 | 3.339e-10 | 3.702e-10 | 4.264e-10 |
| 2.240e-03  | 2.049e-10 | 2.472e-10 | 2.830e-10 | 3.125e-10 | 3.468e-10 | 3.993e-10 |
| 2.410e-03  | 1.949e-10 | 2.352e-10 | 2.692e-10 | 2.974e-10 | 3.303e-10 | 3.801e-10 |
| 2.470e-03  | 1.846e-10 | 2.228e-10 | 2.550e-10 | 2.818e-10 | 3.131e-10 | 3.603e-10 |
| 2.630e-03  | 1.727e-10 | 2.084e-10 | 2.385e-10 | 2.637e-10 | 2.932e-10 | 3.373e-10 |
| 2.750e-03  | 1.552e-10 | 1.874e-10 | 2.144e-10 | 2.373e-10 | 2.641e-10 | 3.037e-10 |
| 2.820e-03  | 1.418e-10 | 1.713e-10 | 1.959e-10 | 2.170e-10 | 2.417e-10 | 2.778e-10 |
| 2.960e-03  | 1.253e-10 | 1.514e-10 | 1.731e-10 | 1.920e-10 | 2.142e-10 | 2.460e-10 |
| 3.180e-03  | 1.044e-10 | 1.273e-10 | 1.454e-10 | 1.617e-10 | 1.807e-10 | 2.074e-10 |
| 3.550e-03  | 9.036e-11 | 1.152e-10 | 1.311e-10 | 1.463e-10 | 1.637e-10 | 1.877e-10 |
| 3.610e-03  | 1.134e-10 | 1.046e-10 | 1.186e-10 | 1.330e-10 | 1.488e-10 | 1.706e-10 |
| 3.700e-03  | 6.684e-10 | 1.003e-10 | 1.136e-10 | 1.275e-10 | 1.428e-10 | 1.636e-10 |
| 3.830e-03  | 6.446e-10 | 9.347e-11 | 1.056e-10 | 1.189e-10 | 1.332e-10 | 1.526e-10 |
| 4.030e-03  | 6.044e-10 | 8.227e-11 | 9.253e-11 | 1.048e-10 | 1.175e-10 | 1.345e-10 |
| 4.150e-03  | 5.755e-10 | 6.448e-10 | 8.374e-11 | 9.613e-11 | 1.079e-10 | 1.235e-10 |
| 4.300e-03  | 5.587e-10 | 6.627e-10 | 7.930e-11 | 9.267e-11 | 1.041e-10 | 1.192e-10 |
| 4.500e-03  | 5.335e-10 | 6.320e-10 | 9.252e-11 | 8.754e-11 | 9.851e-11 | 1.128e-10 |
| 4.810e-03  | 4.897e-10 | 5.787e-10 | 5.692e-10 | 7.876e-11 | 8.891e-11 | 1.017e-10 |
| 5.160e-03  | 4.271e-10 | 5.025e-10 | 5.147e-10 | 3.395e-10 | 7.513e-11 | 8.618e-11 |
| 5.470e-03  | 3.917e-10 | 4.595e-10 | 4.770e-10 | 5.239e-10 | 7.475e-11 | 7.777e-11 |
| 5.550e-03  | 3.724e-10 | 4.361e-10 | 4.544e-10 | 4.987e-10 | 5.406e-10 | 7.331e-11 |
| 5.930e-03  | 3.458e-10 | 4.041e-10 | 4.234e-10 | 4.639e-10 | 5.089e-10 | 6.724e-11 |
| 5.980e-03  | 3.187e-10 | 3.713e-10 | 3.917e-10 | 4.283e-10 | 4.762e-10 | 6.107e-11 |
| 6.250e-03  | 3.086e-10 | 3.593e-10 | 3.799e-10 | 4.152e-10 | 4.629e-10 | 5.043e-10 |
| 6.540e-03  | 2.975e-10 | 3.461e-10 | 3.667e-10 | 4.007e-10 | 4.462e-10 | 5.008e-10 |
| 6.750e-03  | 2.858e-10 | 3.323e-10 | 3.528e-10 | 3.853e-10 | 4.287e-10 | 4.815e-10 |
| 6.980e-03  | 2.740e-10 | 3.184e-10 | 3.387e-10 | 3.698e-10 | 4.110e-10 | 4.621e-10 |
| 7.110e-03  | 2.633e-10 | 3.058e-10 | 3.261e-10 | 3.559e-10 | 3.951e-10 | 4.446e-10 |
| 7.250e-03  | 2.547e-10 | 2.957e-10 | 3.158e-10 | 3.446e-10 | 3.822e-10 | 4.304e-10 |
| 7.710e-03  | 2.335e-10 | 2.708e-10 | 2.905e-10 | 3.168e-10 | 3.505e-10 | 3.955e-10 |
| 7.940e-03  | 2.065e-10 | 2.390e-10 | 2.582e-10 | 2.812e-10 | 3.101e-10 | 3.508e-10 |
| 8.180e-03  | 1.907e-10 | 2.204e-10 | 2.392e-10 | 2.603e-10 | 2.864e-10 | 3.247e-10 |
| 8.380e-03  | 1.853e-10 | 2.141e-10 | 2.326e-10 | 2.532e-10 | 2.784e-10 | 3.158e-10 |
| 8.600e-03  | 1.801e-10 | 2.080e-10 | 2.263e-10 | 2.463e-10 | 2.707e-10 | 3.072e-10 |
| 8.980e-03  | 1.717e-10 | 1.984e-10 | 2.161e-10 | 2.352e-10 | 2.583e-10 | 2.934e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -K-       | -Ca-      | -Sc-      | -Ti-      | - V-      | -Cr-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <hr/>      |           |           |           |           |           |           |
| 9.200e-03  | 1.624e-10 | 1.877e-10 | 2.048e-10 | 2.230e-10 | 2.446e-10 | 2.782e-10 |
| 9.400e-03  | 1.553e-10 | 1.794e-10 | 1.961e-10 | 2.135e-10 | 2.341e-10 | 2.664e-10 |
| 9.560e-03  | 1.488e-10 | 1.720e-10 | 1.882e-10 | 2.049e-10 | 2.245e-10 | 2.557e-10 |
| 9.800e-03  | 1.412e-10 | 1.631e-10 | 1.788e-10 | 1.948e-10 | 2.132e-10 | 2.431e-10 |
| 1.000e-02  | 1.323e-10 | 1.528e-10 | 1.680e-10 | 1.829e-10 | 2.000e-10 | 2.283e-10 |
| 1.040e-02  | 1.270e-10 | 1.467e-10 | 1.615e-10 | 1.759e-10 | 1.922e-10 | 2.196e-10 |
| 1.080e-02  | 1.245e-10 | 1.439e-10 | 1.583e-10 | 1.726e-10 | 1.885e-10 | 2.155e-10 |
| 1.110e-02  | 1.218e-10 | 1.408e-10 | 1.550e-10 | 1.690e-10 | 1.846e-10 | 2.110e-10 |
| 1.190e-02  | 1.166e-10 | 1.349e-10 | 1.486e-10 | 1.621e-10 | 1.769e-10 | 2.025e-10 |
| 1.270e-02  | 1.073e-10 | 1.242e-10 | 1.370e-10 | 1.495e-10 | 1.632e-10 | 1.869e-10 |
| 1.300e-02  | 9.963e-11 | 1.155e-10 | 1.274e-10 | 1.392e-10 | 1.519e-10 | 1.741e-10 |
| 1.390e-02  | 8.987e-11 | 1.043e-10 | 1.152e-10 | 1.260e-10 | 1.374e-10 | 1.578e-10 |
| 1.470e-02  | 7.403e-11 | 8.610e-11 | 9.544e-11 | 1.046e-10 | 1.139e-10 | 1.312e-10 |
| 1.520e-02  | 6.102e-11 | 7.119e-11 | 7.916e-11 | 8.702e-11 | 9.458e-11 | 1.093e-10 |
| 1.570e-02  | 5.773e-11 | 6.742e-11 | 7.501e-11 | 8.254e-11 | 8.969e-11 | 1.038e-10 |
| 1.640e-02  | 5.558e-11 | 6.496e-11 | 7.227e-11 | 7.958e-11 | 8.648e-11 | 1.001e-10 |
| 1.700e-02  | 5.289e-11 | 6.189e-11 | 6.884e-11 | 7.588e-11 | 8.246e-11 | 9.552e-11 |
| 1.720e-02  | 5.105e-11 | 5.979e-11 | 6.650e-11 | 7.335e-11 | 7.971e-11 | 9.237e-11 |
| 1.810e-02  | 4.824e-11 | 5.657e-11 | 6.291e-11 | 6.946e-11 | 7.550e-11 | 8.755e-11 |
| 1.900e-02  | 4.310e-11 | 5.067e-11 | 5.633e-11 | 6.234e-11 | 6.776e-11 | 7.869e-11 |
| 1.970e-02  | 3.792e-11 | 4.472e-11 | 4.970e-11 | 5.516e-11 | 5.996e-11 | 6.975e-11 |
| 2.010e-02  | 3.411e-11 | 4.035e-11 | 4.482e-11 | 4.988e-11 | 5.422e-11 | 6.316e-11 |
| 2.100e-02  | 3.286e-11 | 3.891e-11 | 4.322e-11 | 4.814e-11 | 5.234e-11 | 6.100e-11 |
| 2.170e-02  | 3.212e-11 | 3.806e-11 | 4.226e-11 | 4.710e-11 | 5.122e-11 | 5.971e-11 |
| 2.230e-02  | 3.141e-11 | 3.724e-11 | 4.134e-11 | 4.610e-11 | 5.014e-11 | 5.846e-11 |
| 2.310e-02  | 3.053e-11 | 3.622e-11 | 4.019e-11 | 4.485e-11 | 4.879e-11 | 5.690e-11 |
| 2.550e-02  | 2.803e-11 | 3.333e-11 | 3.695e-11 | 4.130e-11 | 4.495e-11 | 5.247e-11 |
| 2.920e-02  | 2.161e-11 | 2.587e-11 | 2.859e-11 | 3.214e-11 | 3.503e-11 | 4.099e-11 |
| 3.320e-02  | 1.414e-11 | 1.717e-11 | 1.885e-11 | 2.144e-11 | 2.344e-11 | 2.756e-11 |
| 3.750e-02  | 1.162e-11 | 1.419e-11 | 1.553e-11 | 1.775e-11 | 1.944e-11 | 2.289e-11 |
| 4.200e-02  | 8.454e-12 | 1.043e-11 | 1.133e-11 | 1.307e-11 | 1.436e-11 | 1.695e-11 |
| 4.740e-02  | 6.775e-12 | 8.420e-12 | 9.096e-12 | 1.055e-11 | 1.162e-11 | 1.374e-11 |
| 4.850e-02  | 5.762e-12 | 7.195e-12 | 7.740e-12 | 9.013e-12 | 9.945e-12 | 1.177e-11 |
| 5.020e-02  | 5.254e-12 | 6.579e-12 | 7.059e-12 | 8.241e-12 | 9.104e-12 | 1.078e-11 |
| 5.500e-02  | 4.678e-12 | 5.876e-12 | 6.282e-12 | 7.356e-12 | 8.136e-12 | 9.637e-12 |
| 6.100e-02  | 3.845e-12 | 4.851e-12 | 5.156e-12 | 6.062e-12 | 6.718e-12 | 7.959e-12 |
| 6.750e-02  | 3.267e-12 | 4.134e-12 | 4.370e-12 | 5.154e-12 | 5.719e-12 | 6.775e-12 |
| 6.950e-02  | 3.016e-12 | 3.818e-12 | 4.026e-12 | 4.751e-12 | 5.275e-12 | 6.247e-12 |
| 7.350e-02  | 2.798e-12 | 3.543e-12 | 3.727e-12 | 4.403e-12 | 4.889e-12 | 5.789e-12 |
| 7.840e-02  | 2.422e-12 | 3.070e-12 | 3.213e-12 | 3.801e-12 | 4.225e-12 | 4.999e-12 |
| 8.070e-02  | 2.083e-12 | 2.643e-12 | 2.750e-12 | 3.260e-12 | 3.626e-12 | 4.287e-12 |
| 8.550e-02  | 1.962e-12 | 2.488e-12 | 2.581e-12 | 3.060e-12 | 3.403e-12 | 4.021e-12 |
| 8.800e-02  | 1.873e-12 | 2.371e-12 | 2.455e-12 | 2.908e-12 | 3.234e-12 | 3.818e-12 |
| 9.050e-02  | 1.802e-12 | 2.279e-12 | 2.356e-12 | 2.790e-12 | 3.102e-12 | 3.660e-12 |
| 9.230e-02  | 1.736e-12 | 2.193e-12 | 2.263e-12 | 2.679e-12 | 2.978e-12 | 3.512e-12 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -K-       | -Ca-      | -Sc-      | -Ti-      | - V-      | -Cr-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.600e-02  | 1.643e-12 | 2.073e-12 | 2.134e-12 | 2.524e-12 | 2.805e-12 | 3.304e-12 |
| 1.000e-01  | 1.500e-12 | 1.887e-12 | 1.933e-12 | 2.284e-12 | 2.538e-12 | 2.985e-12 |
| 1.050e-01  | 1.427e-12 | 1.787e-12 | 1.823e-12 | 2.149e-12 | 2.383e-12 | 2.797e-12 |
| 1.100e-01  | 1.435e-12 | 1.787e-12 | 1.818e-12 | 2.135e-12 | 2.363e-12 | 2.766e-12 |
| 1.150e-01  | 1.435e-12 | 1.776e-12 | 1.802e-12 | 2.107e-12 | 2.327e-12 | 2.717e-12 |
| 1.210e-01  | 1.425e-12 | 1.752e-12 | 1.771e-12 | 2.061e-12 | 2.269e-12 | 2.642e-12 |
| 1.350e-01  | 1.378e-12 | 1.670e-12 | 1.677e-12 | 1.931e-12 | 2.113e-12 | 2.443e-12 |
| 1.490e-01  | 1.258e-12 | 1.485e-12 | 1.471e-12 | 1.661e-12 | 1.797e-12 | 2.049e-12 |
| 1.640e-01  | 1.190e-12 | 1.367e-12 | 1.336e-12 | 1.476e-12 | 1.576e-12 | 1.769e-12 |
| 1.800e-01  | 1.239e-12 | 1.401e-12 | 1.361e-12 | 1.483e-12 | 1.569e-12 | 1.744e-12 |
| 1.980e-01  | 1.266e-12 | 1.405e-12 | 1.355e-12 | 1.450e-12 | 1.517e-12 | 1.663e-12 |
| 2.180e-01  | 1.314e-12 | 1.434e-12 | 1.373e-12 | 1.446e-12 | 1.496e-12 | 1.620e-12 |
| 2.390e-01  | 1.415e-12 | 1.531e-12 | 1.463e-12 | 1.527e-12 | 1.570e-12 | 1.690e-12 |
| 2.630e-01  | 1.508e-12 | 1.618e-12 | 1.540e-12 | 1.593e-12 | 1.627e-12 | 1.738e-12 |
| 2.900e-01  | 1.591e-12 | 1.689e-12 | 1.602e-12 | 1.638e-12 | 1.659e-12 | 1.755e-12 |
| 3.190e-01  | 1.673e-12 | 1.757e-12 | 1.661e-12 | 1.678e-12 | 1.684e-12 | 1.765e-12 |
| 3.510e-01  | 1.799e-12 | 1.882e-12 | 1.776e-12 | 1.786e-12 | 1.786e-12 | 1.864e-12 |
| 3.860e-01  | 1.924e-12 | 2.005e-12 | 1.889e-12 | 1.891e-12 | 1.884e-12 | 1.958e-12 |
| 4.240e-01  | 2.047e-12 | 2.124e-12 | 1.999e-12 | 1.991e-12 | 1.976e-12 | 2.045e-12 |
| 4.670e-01  | 2.194e-12 | 2.272e-12 | 2.137e-12 | 2.123e-12 | 2.103e-12 | 2.172e-12 |
| 5.130e-01  | 2.342e-12 | 2.420e-12 | 2.274e-12 | 2.254e-12 | 2.228e-12 | 2.295e-12 |
| 5.650e-01  | 2.571e-12 | 2.652e-12 | 2.491e-12 | 2.464e-12 | 2.432e-12 | 2.502e-12 |
| 6.210e-01  | 2.828e-12 | 2.914e-12 | 2.735e-12 | 2.702e-12 | 2.664e-12 | 2.736e-12 |
| 6.830e-01  | 3.105e-12 | 3.197e-12 | 3.000e-12 | 2.960e-12 | 2.918e-12 | 2.994e-12 |
| 7.510e-01  | 3.384e-12 | 3.482e-12 | 3.266e-12 | 3.221e-12 | 3.173e-12 | 3.253e-12 |
| 8.260e-01  | 3.654e-12 | 3.757e-12 | 3.523e-12 | 3.471e-12 | 3.417e-12 | 3.501e-12 |
| 9.090e-01  | 3.950e-12 | 4.060e-12 | 3.807e-12 | 3.748e-12 | 3.690e-12 | 3.779e-12 |
| 1.000e+00  | 4.245e-12 | 4.362e-12 | 4.089e-12 | 4.025e-12 | 3.961e-12 | 4.055e-12 |
| 1.120e+00  | 4.644e-12 | 4.771e-12 | 4.471e-12 | 4.400e-12 | 4.329e-12 | 4.431e-12 |
| 1.270e+00  | 5.175e-12 | 5.316e-12 | 4.982e-12 | 4.902e-12 | 4.823e-12 | 4.935e-12 |
| 1.420e+00  | 5.671e-12 | 5.826e-12 | 5.459e-12 | 5.371e-12 | 5.284e-12 | 5.407e-12 |
| 1.600e+00  | 6.132e-12 | 6.300e-12 | 5.902e-12 | 5.808e-12 | 5.713e-12 | 5.846e-12 |
| 1.800e+00  | 6.706e-12 | 6.892e-12 | 6.459e-12 | 6.357e-12 | 6.255e-12 | 6.401e-12 |
| 2.030e+00  | 7.273e-12 | 7.477e-12 | 7.010e-12 | 6.902e-12 | 6.794e-12 | 6.956e-12 |
| 2.280e+00  | 8.001e-12 | 8.231e-12 | 7.721e-12 | 7.607e-12 | 7.492e-12 | 7.675e-12 |
| 2.570e+00  | 8.862e-12 | 9.124e-12 | 8.565e-12 | 8.445e-12 | 8.324e-12 | 8.535e-12 |
| 2.890e+00  | 9.711e-12 | 1.001e-11 | 9.406e-12 | 9.284e-12 | 9.161e-12 | 9.402e-12 |
| 3.250e+00  | 1.059e-11 | 1.093e-11 | 1.029e-11 | 1.017e-11 | 1.004e-11 | 1.032e-11 |
| 3.650e+00  | 1.171e-11 | 1.210e-11 | 1.141e-11 | 1.129e-11 | 1.117e-11 | 1.149e-11 |
| 4.110e+00  | 1.289e-11 | 1.334e-11 | 1.260e-11 | 1.249e-11 | 1.238e-11 | 1.276e-11 |
| 4.620e+00  | 1.435e-11 | 1.488e-11 | 1.407e-11 | 1.398e-11 | 1.387e-11 | 1.432e-11 |
| 5.200e+00  | 1.600e-11 | 1.664e-11 | 1.576e-11 | 1.568e-11 | 1.559e-11 | 1.612e-11 |
| 5.850e+00  | 1.785e-11 | 1.860e-11 | 1.765e-11 | 1.759e-11 | 1.752e-11 | 1.815e-11 |
| 6.580e+00  | 1.999e-11 | 2.087e-11 | 1.985e-11 | 1.982e-11 | 1.978e-11 | 2.052e-11 |
| 7.410e+00  | 2.265e-11 | 2.369e-11 | 2.257e-11 | 2.258e-11 | 2.258e-11 | 2.348e-11 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -K-       | -Ca-      | -Sc-      | -Ti-      | - V-      | -Cr-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 8.330e+00  | 2.560e-11 | 2.683e-11 | 2.563e-11 | 2.570e-11 | 2.575e-11 | 2.683e-11 |
| 9.370e+00  | 2.927e-11 | 3.075e-11 | 2.944e-11 | 2.958e-11 | 2.971e-11 | 3.101e-11 |
| 1.060e+01  | 3.369e-11 | 3.547e-11 | 3.404e-11 | 3.428e-11 | 3.450e-11 | 3.609e-11 |
| 1.190e+01  | 3.860e-11 | 4.072e-11 | 3.914e-11 | 3.948e-11 | 3.979e-11 | 4.168e-11 |
| 1.340e+01  | 4.413e-11 | 4.663e-11 | 4.489e-11 | 4.535e-11 | 4.578e-11 | 4.801e-11 |
| 2.000e+01  | 6.153e-11 | 6.530e-11 | 6.311e-11 | 6.399e-11 | 6.481e-11 | 6.819e-11 |
| 3.000e+01  | 1.014e-10 | 1.081e-10 | 1.049e-10 | 1.067e-10 | 1.084e-10 | 1.145e-10 |
| 4.000e+01  | 1.529e-10 | 1.634e-10 | 1.589e-10 | 1.620e-10 | 1.650e-10 | 1.744e-10 |
| 5.000e+01  | 2.080e-10 | 2.226e-10 | 2.167e-10 | 2.213e-10 | 2.255e-10 | 2.387e-10 |
| 7.500e+01  | 3.087e-10 | 3.308e-10 | 3.225e-10 | 3.297e-10 | 3.364e-10 | 3.564e-10 |
| 1.000e+02  | 4.614e-10 | 4.947e-10 | 4.827e-10 | 4.938e-10 | 5.043e-10 | 5.346e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -Mn-      | -Fe-      | -Co-      | -Ni-      | -Cu-      | -Zn-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1.000e-04  |           |           |           |           |           |           |
| 1.080e-04  | 7.286e-10 | 8.426e-10 | 8.910e-10 | 9.484e-10 | 1.031e-09 | 1.098e-09 |
| 1.140e-04  | 7.371e-10 | 8.530e-10 | 9.092e-10 | 9.741e-10 | 1.024e-09 | 1.116e-09 |
| 1.360e-04  | 7.366e-10 | 8.538e-10 | 9.155e-10 | 1.034e-09 | 1.065e-09 | 1.130e-09 |
| 1.560e-04  | 7.036e-10 | 8.182e-10 | 8.875e-10 | 1.030e-09 | 1.130e-09 | 1.199e-09 |
| 1.700e-04  | 6.847e-10 | 7.970e-10 | 8.696e-10 | 1.017e-09 | 1.127e-09 | 1.204e-09 |
| 1.840e-04  | 6.679e-10 | 7.773e-10 | 8.510e-10 | 9.943e-10 | 1.093e-09 | 1.192e-09 |
| 1.910e-04  | 6.477e-10 | 7.538e-10 | 8.279e-10 | 9.666e-10 | 1.054e-09 | 1.172e-09 |
| 2.140e-04  | 6.195e-10 | 7.208e-10 | 7.947e-10 | 9.271e-10 | 1.002e-09 | 1.140e-09 |
| 2.240e-04  | 6.108e-10 | 7.104e-10 | 7.842e-10 | 9.152e-10 | 9.879e-10 | 1.130e-09 |
| 2.410e-04  | 6.014e-10 | 6.992e-10 | 7.721e-10 | 9.016e-10 | 9.736e-10 | 1.116e-09 |
| 2.470e-04  | 5.896e-10 | 6.852e-10 | 7.570e-10 | 8.845e-10 | 9.554e-10 | 1.097e-09 |
| 2.630e-04  | 5.740e-10 | 6.668e-10 | 7.370e-10 | 8.617e-10 | 9.312e-10 | 1.072e-09 |
| 2.750e-04  | 5.495e-10 | 6.379e-10 | 7.056e-10 | 8.257e-10 | 8.928e-10 | 1.031e-09 |
| 2.820e-04  | 5.295e-10 | 6.144e-10 | 6.800e-10 | 7.964e-10 | 8.615e-10 | 9.973e-10 |
| 2.960e-04  | 5.040e-10 | 5.844e-10 | 6.472e-10 | 7.588e-10 | 8.213e-10 | 9.540e-10 |
| 3.180e-04  | 4.719e-10 | 5.468e-10 | 6.061e-10 | 7.113e-10 | 7.704e-10 | 8.986e-10 |
| 3.550e-04  | 4.515e-10 | 5.228e-10 | 5.794e-10 | 6.796e-10 | 7.360e-10 | 8.593e-10 |
| 3.610e-04  | 4.313e-10 | 4.992e-10 | 5.530e-10 | 6.483e-10 | 7.021e-10 | 8.203e-10 |
| 3.700e-04  | 4.225e-10 | 4.889e-10 | 5.416e-10 | 6.348e-10 | 6.874e-10 | 8.035e-10 |
| 3.830e-04  | 4.083e-10 | 4.724e-10 | 5.232e-10 | 6.130e-10 | 6.638e-10 | 7.762e-10 |
| 4.030e-04  | 3.844e-10 | 4.445e-10 | 4.921e-10 | 5.762e-10 | 6.239e-10 | 7.302e-10 |
| 4.150e-04  | 3.692e-10 | 4.268e-10 | 4.723e-10 | 5.533e-10 | 6.009e-10 | 7.012e-10 |
| 4.300e-04  | 3.625e-10 | 4.191e-10 | 4.635e-10 | 5.438e-10 | 5.935e-10 | 6.886e-10 |
| 4.500e-04  | 3.521e-10 | 4.070e-10 | 4.498e-10 | 5.288e-10 | 5.813e-10 | 6.688e-10 |
| 4.810e-04  | 3.332e-10 | 3.851e-10 | 4.249e-10 | 5.015e-10 | 5.582e-10 | 6.330e-10 |
| 5.160e-04  | 3.050e-10 | 3.524e-10 | 3.881e-10 | 4.607e-10 | 5.217e-10 | 5.795e-10 |
| 5.470e-04  | 2.877e-10 | 3.319e-10 | 3.665e-10 | 4.361e-10 | 4.926e-10 | 5.448e-10 |
| 5.550e-04  | 2.776e-10 | 3.199e-10 | 3.541e-10 | 4.217e-10 | 4.741e-10 | 5.244e-10 |
| 5.930e-04  | 2.635e-10 | 3.032e-10 | 3.366e-10 | 4.015e-10 | 4.482e-10 | 4.958e-10 |
| 5.980e-04  | 2.500e-10 | 2.875e-10 | 3.185e-10 | 3.805e-10 | 4.215e-10 | 4.662e-10 |
| 6.250e-04  | 2.432e-10 | 2.805e-10 | 3.101e-10 | 3.695e-10 | 4.067e-10 | 4.528e-10 |
| 6.540e-04  | 5.651e-10 | 2.682e-10 | 2.981e-10 | 3.525e-10 | 3.831e-10 | 4.341e-10 |
| 6.750e-04  | 1.653e-09 | 2.555e-10 | 2.856e-10 | 3.350e-10 | 3.591e-10 | 4.146e-10 |
| 6.980e-04  | 1.793e-09 | 2.454e-10 | 2.731e-10 | 3.175e-10 | 3.354e-10 | 3.951e-10 |
| 7.110e-04  | 1.734e-09 | 2.382e-10 | 2.633e-10 | 3.048e-10 | 3.198e-10 | 3.804e-10 |
| 7.250e-04  | 1.695e-09 | 1.033e-09 | 2.588e-10 | 3.007e-10 | 3.185e-10 | 3.745e-10 |
| 7.710e-04  | 1.613e-09 | 1.638e-09 | 2.473e-10 | 2.902e-10 | 3.150e-10 | 3.594e-10 |
| 7.940e-04  | 1.738e-09 | 1.712e-09 | 6.907e-10 | 2.762e-10 | 3.095e-10 | 3.395e-10 |
| 8.180e-04  | 1.662e-09 | 1.643e-09 | 1.684e-09 | 2.654e-10 | 3.019e-10 | 3.258e-10 |
| 8.380e-04  | 1.618e-09 | 1.584e-09 | 1.684e-09 | 2.546e-10 | 2.875e-10 | 3.157e-10 |
| 8.600e-04  | 1.573e-09 | 1.686e-09 | 1.655e-09 | 2.443e-10 | 2.724e-10 | 3.053e-10 |
| 8.980e-04  | 1.501e-09 | 1.696e-09 | 1.587e-09 | 1.262e-09 | 2.487e-10 | 2.887e-10 |
| 9.200e-04  | 1.442e-09 | 1.623e-09 | 1.509e-09 | 1.753e-09 | 2.313e-10 | 2.734e-10 |
| 9.400e-04  | 1.432e-09 | 1.597e-09 | 1.647e-09 | 1.741e-09 | 3.225e-10 | 2.662e-10 |
| 9.560e-04  | 1.421e-09 | 1.574e-09 | 1.720e-09 | 1.728e-09 | 1.318e-09 | 2.596e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -Mn-      | -Fe-      | -Co-      | -Ni-      | -Cu-      | -Zn-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.800e-04  | 1.408e-09 | 1.545e-09 | 1.724e-09 | 1.710e-09 | 1.768e-09 | 2.552e-10 |
| 9.900e-04  | 1.395e-09 | 1.518e-09 | 1.727e-09 | 1.694e-09 | 1.898e-09 | 2.551e-10 |
| 1.000e-03  | 1.386e-09 | 1.502e-09 | 1.728e-09 | 1.683e-09 | 1.972e-09 | 2.550e-10 |
| 1.080e-03  | 1.363e-09 | 1.474e-09 | 1.704e-09 | 1.857e-09 | 1.904e-09 | 1.356e-09 |
| 1.140e-03  | 1.317e-09 | 1.427e-09 | 1.647e-09 | 1.832e-09 | 1.909e-09 | 1.818e-09 |
| 1.360e-03  | 1.165e-09 | 1.271e-09 | 1.457e-09 | 1.628e-09 | 1.790e-09 | 1.700e-09 |
| 1.560e-03  | 8.358e-10 | 9.295e-10 | 1.045e-09 | 1.182e-09 | 1.342e-09 | 1.372e-09 |
| 1.700e-03  | 6.930e-10 | 7.793e-10 | 8.664e-10 | 9.866e-10 | 1.132e-09 | 1.180e-09 |
| 1.840e-03  | 6.234e-10 | 7.040e-10 | 7.799e-10 | 8.893e-10 | 1.015e-09 | 1.059e-09 |
| 1.910e-03  | 5.583e-10 | 6.335e-10 | 6.991e-10 | 7.984e-10 | 9.064e-10 | 9.457e-10 |
| 2.140e-03  | 4.752e-10 | 5.431e-10 | 5.958e-10 | 6.821e-10 | 7.678e-10 | 8.018e-10 |
| 2.240e-03  | 4.452e-10 | 5.101e-10 | 5.586e-10 | 6.401e-10 | 7.183e-10 | 7.508e-10 |
| 2.410e-03  | 4.239e-10 | 4.864e-10 | 5.323e-10 | 6.103e-10 | 6.836e-10 | 7.153e-10 |
| 2.470e-03  | 4.019e-10 | 4.618e-10 | 5.050e-10 | 5.794e-10 | 6.478e-10 | 6.784e-10 |
| 2.630e-03  | 3.764e-10 | 4.332e-10 | 4.733e-10 | 5.436e-10 | 6.063e-10 | 6.358e-10 |
| 2.750e-03  | 3.391e-10 | 3.913e-10 | 4.270e-10 | 4.910e-10 | 5.457e-10 | 5.733e-10 |
| 2.820e-03  | 3.103e-10 | 3.590e-10 | 3.913e-10 | 4.504e-10 | 4.989e-10 | 5.251e-10 |
| 2.960e-03  | 2.749e-10 | 3.193e-10 | 3.474e-10 | 4.005e-10 | 4.415e-10 | 4.659e-10 |
| 3.180e-03  | 2.320e-10 | 2.709e-10 | 2.940e-10 | 3.398e-10 | 3.719e-10 | 3.941e-10 |
| 3.550e-03  | 2.101e-10 | 2.457e-10 | 2.668e-10 | 3.088e-10 | 3.369e-10 | 3.582e-10 |
| 3.610e-03  | 1.910e-10 | 2.237e-10 | 2.430e-10 | 2.816e-10 | 3.064e-10 | 3.269e-10 |
| 3.700e-03  | 1.833e-10 | 2.147e-10 | 2.334e-10 | 2.705e-10 | 2.940e-10 | 3.141e-10 |
| 3.830e-03  | 1.710e-10 | 2.006e-10 | 2.180e-10 | 2.530e-10 | 2.744e-10 | 2.938e-10 |
| 4.030e-03  | 1.508e-10 | 1.773e-10 | 1.929e-10 | 2.241e-10 | 2.422e-10 | 2.606e-10 |
| 4.150e-03  | 1.385e-10 | 1.630e-10 | 1.775e-10 | 2.065e-10 | 2.226e-10 | 2.403e-10 |
| 4.300e-03  | 1.336e-10 | 1.573e-10 | 1.714e-10 | 1.995e-10 | 2.149e-10 | 2.324e-10 |
| 4.500e-03  | 1.265e-10 | 1.489e-10 | 1.625e-10 | 1.892e-10 | 2.035e-10 | 2.206e-10 |
| 4.810e-03  | 1.142e-10 | 1.345e-10 | 1.470e-10 | 1.714e-10 | 1.840e-10 | 2.003e-10 |
| 5.160e-03  | 9.674e-11 | 1.141e-10 | 1.252e-10 | 1.462e-10 | 1.564e-10 | 1.716e-10 |
| 5.470e-03  | 8.737e-11 | 1.031e-10 | 1.134e-10 | 1.325e-10 | 1.415e-10 | 1.561e-10 |
| 5.550e-03  | 8.240e-11 | 9.719e-11 | 1.071e-10 | 1.253e-10 | 1.337e-10 | 1.479e-10 |
| 5.930e-03  | 7.565e-11 | 8.921e-11 | 9.856e-11 | 1.154e-10 | 1.230e-10 | 1.367e-10 |
| 5.980e-03  | 6.877e-11 | 8.108e-11 | 8.985e-11 | 1.053e-10 | 1.120e-10 | 1.252e-10 |
| 6.250e-03  | 6.529e-11 | 7.751e-11 | 8.651e-11 | 1.016e-10 | 1.081e-10 | 1.211e-10 |
| 6.540e-03  | 6.082e-11 | 7.273e-11 | 8.262e-11 | 9.772e-11 | 1.039e-10 | 1.166e-10 |
| 6.750e-03  | 4.849e-10 | 6.789e-11 | 7.861e-11 | 9.363e-11 | 9.947e-11 | 1.120e-10 |
| 6.980e-03  | 4.687e-10 | 6.314e-11 | 7.462e-11 | 8.951e-11 | 9.505e-11 | 1.073e-10 |
| 7.110e-03  | 4.539e-10 | 5.893e-11 | 7.106e-11 | 8.582e-11 | 9.109e-11 | 1.031e-10 |
| 7.250e-03  | 4.419e-10 | 4.616e-10 | 6.818e-11 | 8.284e-11 | 8.788e-11 | 9.967e-11 |
| 7.710e-03  | 4.121e-10 | 4.421e-10 | 6.250e-11 | 7.550e-11 | 8.002e-11 | 9.128e-11 |
| 7.940e-03  | 3.737e-10 | 4.108e-10 | 4.539e-10 | 6.616e-11 | 7.000e-11 | 8.056e-11 |
| 8.180e-03  | 3.506e-10 | 3.914e-10 | 4.353e-10 | 6.034e-11 | 6.395e-11 | 7.426e-11 |
| 8.380e-03  | 3.413e-10 | 3.818e-10 | 4.246e-10 | 4.491e-10 | 6.130e-11 | 7.196e-11 |
| 8.600e-03  | 3.321e-10 | 3.722e-10 | 4.136e-10 | 4.366e-10 | 5.871e-11 | 6.974e-11 |
| 8.980e-03  | 3.173e-10 | 3.567e-10 | 3.959e-10 | 4.206e-10 | 5.607e-11 | 6.621e-11 |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | -Mn-      | -Fe-      | -Co-      | -Ni-      | -Cu-      | -Zn-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.200e-03  | 3.009e-10 | 3.394e-10 | 3.763e-10 | 4.027e-10 | 4.071e-10 | 6.231e-11 |
| 9.400e-03  | 2.883e-10 | 3.261e-10 | 3.612e-10 | 3.888e-10 | 3.953e-10 | 5.932e-11 |
| 9.560e-03  | 2.768e-10 | 3.139e-10 | 3.474e-10 | 3.761e-10 | 3.843e-10 | 5.660e-11 |
| 9.800e-03  | 2.632e-10 | 2.996e-10 | 3.310e-10 | 3.611e-10 | 3.713e-10 | 2.608e-10 |
| 1.000e-02  | 2.474e-10 | 2.828e-10 | 3.120e-10 | 3.434e-10 | 3.560e-10 | 3.938e-10 |
| 1.040e-02  | 2.380e-10 | 2.728e-10 | 3.007e-10 | 3.327e-10 | 3.463e-10 | 3.847e-10 |
| 1.080e-02  | 2.335e-10 | 2.679e-10 | 2.952e-10 | 3.269e-10 | 3.403e-10 | 3.782e-10 |
| 1.110e-02  | 2.288e-10 | 2.627e-10 | 2.894e-10 | 3.208e-10 | 3.339e-10 | 3.712e-10 |
| 1.190e-02  | 2.195e-10 | 2.525e-10 | 2.779e-10 | 3.086e-10 | 3.213e-10 | 3.574e-10 |
| 1.270e-02  | 2.027e-10 | 2.338e-10 | 2.572e-10 | 2.865e-10 | 2.983e-10 | 3.322e-10 |
| 1.300e-02  | 1.889e-10 | 2.185e-10 | 2.401e-10 | 2.682e-10 | 2.793e-10 | 3.113e-10 |
| 1.390e-02  | 1.713e-10 | 1.988e-10 | 2.181e-10 | 2.447e-10 | 2.548e-10 | 2.844e-10 |
| 1.470e-02  | 1.426e-10 | 1.667e-10 | 1.824e-10 | 2.063e-10 | 2.150e-10 | 2.406e-10 |
| 1.520e-02  | 1.190e-10 | 1.403e-10 | 1.531e-10 | 1.747e-10 | 1.821e-10 | 2.045e-10 |
| 1.570e-02  | 1.130e-10 | 1.335e-10 | 1.455e-10 | 1.665e-10 | 1.736e-10 | 1.950e-10 |
| 1.640e-02  | 1.090e-10 | 1.289e-10 | 1.404e-10 | 1.608e-10 | 1.677e-10 | 1.885e-10 |
| 1.700e-02  | 1.040e-10 | 1.231e-10 | 1.341e-10 | 1.537e-10 | 1.604e-10 | 1.803e-10 |
| 1.720e-02  | 1.006e-10 | 1.191e-10 | 1.297e-10 | 1.489e-10 | 1.554e-10 | 1.747e-10 |
| 1.810e-02  | 9.539e-11 | 1.130e-10 | 1.230e-10 | 1.414e-10 | 1.477e-10 | 1.661e-10 |
| 1.900e-02  | 8.579e-11 | 1.019e-10 | 1.108e-10 | 1.277e-10 | 1.334e-10 | 1.502e-10 |
| 1.970e-02  | 7.610e-11 | 9.055e-11 | 9.841e-11 | 1.138e-10 | 1.191e-10 | 1.341e-10 |
| 2.010e-02  | 6.897e-11 | 8.222e-11 | 8.928e-11 | 1.036e-10 | 1.085e-10 | 1.223e-10 |
| 2.100e-02  | 6.663e-11 | 7.947e-11 | 8.628e-11 | 1.002e-10 | 1.050e-10 | 1.183e-10 |
| 2.170e-02  | 6.523e-11 | 7.781e-11 | 8.446e-11 | 9.809e-11 | 1.028e-10 | 1.159e-10 |
| 2.230e-02  | 6.387e-11 | 7.619e-11 | 8.270e-11 | 9.608e-11 | 1.008e-10 | 1.136e-10 |
| 2.310e-02  | 6.217e-11 | 7.417e-11 | 8.050e-11 | 9.356e-11 | 9.816e-11 | 1.106e-10 |
| 2.550e-02  | 5.734e-11 | 6.843e-11 | 7.425e-11 | 8.639e-11 | 9.072e-11 | 1.023e-10 |
| 2.920e-02  | 4.486e-11 | 5.356e-11 | 5.808e-11 | 6.780e-11 | 7.142e-11 | 8.052e-11 |
| 3.320e-02  | 3.023e-11 | 3.613e-11 | 3.913e-11 | 4.596e-11 | 4.872e-11 | 5.494e-11 |
| 3.750e-02  | 2.513e-11 | 2.999e-11 | 3.249e-11 | 3.820e-11 | 4.062e-11 | 4.576e-11 |
| 4.200e-02  | 1.864e-11 | 2.217e-11 | 2.403e-11 | 2.829e-11 | 3.025e-11 | 3.402e-11 |
| 4.740e-02  | 1.512e-11 | 1.793e-11 | 1.944e-11 | 2.289e-11 | 2.457e-11 | 2.760e-11 |
| 4.850e-02  | 1.296e-11 | 1.532e-11 | 1.663e-11 | 1.958e-11 | 2.106e-11 | 2.364e-11 |
| 5.020e-02  | 1.187e-11 | 1.401e-11 | 1.521e-11 | 1.791e-11 | 1.930e-11 | 2.165e-11 |
| 5.500e-02  | 1.062e-11 | 1.250e-11 | 1.358e-11 | 1.598e-11 | 1.726e-11 | 1.934e-11 |
| 6.100e-02  | 8.775e-12 | 1.029e-11 | 1.118e-11 | 1.315e-11 | 1.424e-11 | 1.593e-11 |
| 6.750e-02  | 7.473e-12 | 8.725e-12 | 9.489e-12 | 1.114e-11 | 1.210e-11 | 1.352e-11 |
| 6.950e-02  | 6.890e-12 | 8.026e-12 | 8.733e-12 | 1.024e-11 | 1.114e-11 | 1.243e-11 |
| 7.350e-02  | 6.384e-12 | 7.422e-12 | 8.079e-12 | 9.467e-12 | 1.031e-11 | 1.149e-11 |
| 7.840e-02  | 5.513e-12 | 6.382e-12 | 6.952e-12 | 8.131e-12 | 8.869e-12 | 9.875e-12 |
| 8.070e-02  | 4.728e-12 | 5.446e-12 | 5.938e-12 | 6.928e-12 | 7.576e-12 | 8.421e-12 |
| 8.550e-02  | 4.433e-12 | 5.095e-12 | 5.557e-12 | 6.476e-12 | 7.086e-12 | 7.870e-12 |
| 8.800e-02  | 4.208e-12 | 4.828e-12 | 5.265e-12 | 6.130e-12 | 6.710e-12 | 7.447e-12 |
| 9.050e-02  | 4.032e-12 | 4.619e-12 | 5.037e-12 | 5.860e-12 | 6.416e-12 | 7.117e-12 |
| 9.230e-02  | 3.868e-12 | 4.424e-12 | 4.825e-12 | 5.609e-12 | 6.143e-12 | 6.810e-12 |

KERMA  
Gray cm\*\*2

| Energy-MeV | -Mn-      | -Fe-      | -Co-      | -Ni-      | -Cu-      | -Zn-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 9.600e-02  | 3.638e-12 | 4.152e-12 | 4.529e-12 | 5.258e-12 | 5.761e-12 | 6.381e-12 |
| 1.000e-01  | 3.284e-12 | 3.733e-12 | 4.072e-12 | 4.717e-12 | 5.172e-12 | 5.722e-12 |
| 1.050e-01  | 3.073e-12 | 3.481e-12 | 3.796e-12 | 4.389e-12 | 4.811e-12 | 5.315e-12 |
| 1.100e-01  | 3.034e-12 | 3.431e-12 | 3.737e-12 | 4.314e-12 | 4.724e-12 | 5.214e-12 |
| 1.150e-01  | 2.975e-12 | 3.356e-12 | 3.653e-12 | 4.209e-12 | 4.604e-12 | 5.076e-12 |
| 1.210e-01  | 2.887e-12 | 3.248e-12 | 3.530e-12 | 4.059e-12 | 4.434e-12 | 4.882e-12 |
| 1.350e-01  | 2.659e-12 | 2.972e-12 | 3.222e-12 | 3.688e-12 | 4.016e-12 | 4.408e-12 |
| 1.490e-01  | 2.211e-12 | 2.439e-12 | 2.629e-12 | 2.979e-12 | 3.223e-12 | 3.515e-12 |
| 1.640e-01  | 1.889e-12 | 2.054e-12 | 2.197e-12 | 2.460e-12 | 2.638e-12 | 2.853e-12 |
| 1.800e-01  | 1.848e-12 | 1.996e-12 | 2.122e-12 | 2.361e-12 | 2.512e-12 | 2.703e-12 |
| 1.980e-01  | 1.746e-12 | 1.868e-12 | 1.970e-12 | 2.170e-12 | 2.284e-12 | 2.440e-12 |
| 2.180e-01  | 1.683e-12 | 1.785e-12 | 1.865e-12 | 2.036e-12 | 2.117e-12 | 2.244e-12 |
| 2.390e-01  | 1.747e-12 | 1.845e-12 | 1.917e-12 | 2.084e-12 | 2.151e-12 | 2.271e-12 |
| 2.630e-01  | 1.786e-12 | 1.877e-12 | 1.939e-12 | 2.095e-12 | 2.143e-12 | 2.252e-12 |
| 2.900e-01  | 1.789e-12 | 1.870e-12 | 1.915e-12 | 2.054e-12 | 2.076e-12 | 2.166e-12 |
| 3.190e-01  | 1.783e-12 | 1.852e-12 | 1.879e-12 | 1.999e-12 | 1.993e-12 | 2.062e-12 |
| 3.510e-01  | 1.876e-12 | 1.943e-12 | 1.963e-12 | 2.081e-12 | 2.062e-12 | 2.126e-12 |
| 3.860e-01  | 1.963e-12 | 2.029e-12 | 2.040e-12 | 2.156e-12 | 2.122e-12 | 2.179e-12 |
| 4.240e-01  | 2.043e-12 | 2.106e-12 | 2.109e-12 | 2.220e-12 | 2.170e-12 | 2.219e-12 |
| 4.670e-01  | 2.164e-12 | 2.229e-12 | 2.225e-12 | 2.338e-12 | 2.276e-12 | 2.322e-12 |
| 5.130e-01  | 2.282e-12 | 2.347e-12 | 2.337e-12 | 2.451e-12 | 2.377e-12 | 2.418e-12 |
| 5.650e-01  | 2.483e-12 | 2.552e-12 | 2.534e-12 | 2.654e-12 | 2.566e-12 | 2.606e-12 |
| 6.210e-01  | 2.712e-12 | 2.784e-12 | 2.760e-12 | 2.887e-12 | 2.783e-12 | 2.821e-12 |
| 6.830e-01  | 2.965e-12 | 3.042e-12 | 3.012e-12 | 3.148e-12 | 3.031e-12 | 3.068e-12 |
| 7.510e-01  | 3.219e-12 | 3.302e-12 | 3.266e-12 | 3.411e-12 | 3.279e-12 | 3.317e-12 |
| 8.260e-01  | 3.461e-12 | 3.549e-12 | 3.506e-12 | 3.659e-12 | 3.513e-12 | 3.549e-12 |
| 9.090e-01  | 3.734e-12 | 3.827e-12 | 3.778e-12 | 3.942e-12 | 3.782e-12 | 3.818e-12 |
| 1.000e+00  | 4.005e-12 | 4.104e-12 | 4.050e-12 | 4.224e-12 | 4.049e-12 | 4.086e-12 |
| 1.120e+00  | 4.375e-12 | 4.482e-12 | 4.421e-12 | 4.609e-12 | 4.417e-12 | 4.455e-12 |
| 1.270e+00  | 4.872e-12 | 4.991e-12 | 4.921e-12 | 5.130e-12 | 4.915e-12 | 4.955e-12 |
| 1.420e+00  | 5.337e-12 | 5.466e-12 | 5.388e-12 | 5.616e-12 | 5.380e-12 | 5.422e-12 |
| 1.600e+00  | 5.770e-12 | 5.909e-12 | 5.823e-12 | 6.069e-12 | 5.814e-12 | 5.857e-12 |
| 1.800e+00  | 6.319e-12 | 6.473e-12 | 6.380e-12 | 6.650e-12 | 6.372e-12 | 6.420e-12 |
| 2.030e+00  | 6.869e-12 | 7.039e-12 | 6.939e-12 | 7.236e-12 | 6.936e-12 | 6.990e-12 |
| 2.280e+00  | 7.582e-12 | 7.774e-12 | 7.669e-12 | 8.001e-12 | 7.673e-12 | 7.736e-12 |
| 2.570e+00  | 8.438e-12 | 8.659e-12 | 8.547e-12 | 8.924e-12 | 8.565e-12 | 8.642e-12 |
| 2.890e+00  | 9.305e-12 | 9.558e-12 | 9.444e-12 | 9.870e-12 | 9.482e-12 | 9.576e-12 |
| 3.250e+00  | 1.023e-11 | 1.052e-11 | 1.041e-11 | 1.089e-11 | 1.047e-11 | 1.059e-11 |
| 3.650e+00  | 1.140e-11 | 1.174e-11 | 1.163e-11 | 1.219e-11 | 1.174e-11 | 1.188e-11 |
| 4.110e+00  | 1.268e-11 | 1.308e-11 | 1.297e-11 | 1.362e-11 | 1.313e-11 | 1.331e-11 |
| 4.620e+00  | 1.426e-11 | 1.473e-11 | 1.464e-11 | 1.538e-11 | 1.486e-11 | 1.508e-11 |
| 5.200e+00  | 1.607e-11 | 1.663e-11 | 1.655e-11 | 1.742e-11 | 1.686e-11 | 1.714e-11 |
| 5.850e+00  | 1.813e-11 | 1.879e-11 | 1.873e-11 | 1.975e-11 | 1.914e-11 | 1.949e-11 |
| 6.580e+00  | 2.054e-11 | 2.132e-11 | 2.129e-11 | 2.248e-11 | 2.181e-11 | 2.224e-11 |
| 7.410e+00  | 2.353e-11 | 2.447e-11 | 2.447e-11 | 2.588e-11 | 2.515e-11 | 2.568e-11 |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | -Mn-      | -Fe-      | -Co-      | -Ni-      | -Cu-      | -Zn-      |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 8.330e+00  | 2.695e-11 | 2.807e-11 | 2.812e-11 | 2.979e-11 | 2.900e-11 | 2.965e-11 |
| 9.370e+00  | 3.120e-11 | 3.257e-11 | 3.268e-11 | 3.466e-11 | 3.379e-11 | 3.459e-11 |
| 1.060e+01  | 3.638e-11 | 3.804e-11 | 3.823e-11 | 4.062e-11 | 3.965e-11 | 4.064e-11 |
| 1.190e+01  | 4.207e-11 | 4.405e-11 | 4.432e-11 | 4.714e-11 | 4.606e-11 | 4.727e-11 |
| 1.340e+01  | 4.853e-11 | 5.087e-11 | 5.124e-11 | 5.456e-11 | 5.337e-11 | 5.482e-11 |
| 2.000e+01  | 6.914e-11 | 7.268e-11 | 7.340e-11 | 7.835e-11 | 7.683e-11 | 7.910e-11 |
| 3.000e+01  | 1.164e-10 | 1.226e-10 | 1.243e-10 | 1.330e-10 | 1.308e-10 | 1.350e-10 |
| 4.000e+01  | 1.776e-10 | 1.875e-10 | 1.903e-10 | 2.042e-10 | 2.012e-10 | 2.079e-10 |
| 5.000e+01  | 2.434e-10 | 2.571e-10 | 2.612e-10 | 2.804e-10 | 2.765e-10 | 2.859e-10 |
| 7.500e+01  | 3.637e-10 | 3.846e-10 | 3.909e-10 | 4.199e-10 | 4.142e-10 | 4.285e-10 |
| 1.000e+02  | 5.458e-10 | 5.775e-10 | 5.874e-10 | 6.312e-10 | 6.228e-10 | 6.445e-10 |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Tissue Approx. | Bone (Femur) | Muscle (ICRU) | Std. Man  |
|------------|----------------|--------------|---------------|-----------|
| 1.000e-04  |                |              |               |           |
| 1.080e-04  | 8.102e-10      | 6.236e-10    | 8.173e-10     | 7.740e-10 |
| 1.140e-04  | 7.888e-10      | 6.100e-10    | 7.957e-10     | 7.540e-10 |
| 1.360e-04  | 7.142e-10      | 5.739e-10    | 7.212e-10     | 6.862e-10 |
| 1.560e-04  | 5.501e-10      | 5.858e-10    | 5.598e-10     | 5.501e-10 |
| 1.700e-04  | 4.758e-10      | 5.402e-10    | 4.884e-10     | 4.826e-10 |
| 1.840e-04  | 4.362e-10      | 5.170e-10    | 4.571e-10     | 4.497e-10 |
| 1.910e-04  | 3.988e-10      | 4.916e-10    | 4.188e-10     | 4.142e-10 |
| 2.140e-04  | 3.504e-10      | 4.640e-10    | 3.699e-10     | 3.706e-10 |
| 2.240e-04  | 3.322e-10      | 4.440e-10    | 3.512e-10     | 3.541e-10 |
| 2.410e-04  | 3.185e-10      | 4.262e-10    | 3.377e-10     | 3.402e-10 |
| 2.470e-04  | 3.040e-10      | 4.090e-10    | 3.230e-10     | 3.254e-10 |
| 2.630e-04  | 2.873e-10      | 3.920e-10    | 3.058e-10     | 3.086e-10 |
| 2.750e-04  | 2.627e-10      | 3.664e-10    | 2.805e-10     | 2.841e-10 |
| 2.820e-04  | 2.437e-10      | 3.463e-10    | 2.609e-10     | 2.652e-10 |
| 2.960e-04  | 4.875e-10      | 8.188e-10    | 4.573e-10     | 5.639e-10 |
| 3.180e-04  | 4.768e-10      | 8.206e-10    | 4.499e-10     | 5.615e-10 |
| 3.550e-04  | 4.453e-10      | 8.257e-10    | 4.186e-10     | 5.302e-10 |
| 3.610e-04  | 4.164e-10      | 1.014e-09    | 3.913e-10     | 5.208e-10 |
| 3.700e-04  | 4.044e-10      | 1.000e-09    | 3.799e-10     | 5.075e-10 |
| 3.830e-04  | 3.852e-10      | 9.696e-10    | 3.621e-10     | 4.857e-10 |
| 4.030e-04  | 3.577e-10      | 9.120e-10    | 3.370e-10     | 4.522e-10 |
| 4.150e-04  | 3.953e-10      | 9.129e-10    | 3.762e-10     | 4.776e-10 |
| 4.300e-04  | 3.849e-10      | 8.859e-10    | 3.663e-10     | 4.647e-10 |
| 4.500e-04  | 3.691e-10      | 8.728e-10    | 3.514e-10     | 4.480e-10 |
| 4.810e-04  | 3.415e-10      | 8.304e-10    | 3.253e-10     | 4.168e-10 |
| 5.160e-04  | 3.014e-10      | 7.448e-10    | 2.873e-10     | 3.691e-10 |
| 5.470e-04  | 8.014e-10      | 9.922e-10    | 7.983e-10     | 8.163e-10 |
| 5.550e-04  | 1.343e-09      | 1.280e-09    | 1.350e-09     | 1.304e-09 |
| 5.930e-04  | 1.308e-09      | 1.229e-09    | 1.317e-09     | 1.268e-09 |
| 5.980e-04  | 1.271e-09      | 1.176e-09    | 1.281e-09     | 1.228e-09 |
| 6.250e-04  | 1.240e-09      | 1.142e-09    | 1.249e-09     | 1.197e-09 |
| 6.540e-04  | 1.177e-09      | 1.086e-09    | 1.186e-09     | 1.137e-09 |
| 6.750e-04  | 1.113e-09      | 1.027e-09    | 1.121e-09     | 1.075e-09 |
| 6.980e-04  | 1.049e-09      | 9.689e-10    | 1.057e-09     | 1.013e-09 |
| 7.110e-04  | 1.001e-09      | 9.250e-10    | 1.008e-09     | 9.665e-10 |
| 7.250e-04  | 9.808e-10      | 9.062e-10    | 9.884e-10     | 9.528e-10 |
| 7.710e-04  | 9.314e-10      | 8.596e-10    | 9.388e-10     | 9.092e-10 |
| 7.940e-04  | 8.669e-10      | 7.988e-10    | 8.740e-10     | 8.472e-10 |
| 8.180e-04  | 8.242e-10      | 7.588e-10    | 8.311e-10     | 8.055e-10 |
| 8.380e-04  | 7.965e-10      | 7.333e-10    | 8.031e-10     | 7.783e-10 |
| 8.600e-04  | 7.682e-10      | 7.074e-10    | 7.747e-10     | 7.517e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | Tissue Approx. | Bone (Femur) | Muscle (ICRU) | Std. Man  |
|------------|----------------|--------------|---------------|-----------|
| 8.980e-04  | 7.235e-10      | 6.663e-10    | 7.296e-10     | 7.087e-10 |
| 9.200e-04  | 6.829e-10      | 6.294e-10    | 6.888e-10     | 6.691e-10 |
| 9.400e-04  | 6.658e-10      | 6.143e-10    | 6.717e-10     | 6.526e-10 |
| 9.560e-04  | 6.501e-10      | 6.004e-10    | 6.559e-10     | 6.373e-10 |
| 9.800e-04  | 6.313e-10      | 5.838e-10    | 6.370e-10     | 6.190e-10 |
| 9.900e-04  | 6.144e-10      | 5.688e-10    | 6.199e-10     | 6.026e-10 |
| 1.000e-03  | 6.039e-10      | 5.595e-10    | 6.094e-10     | 5.924e-10 |
| 1.080e-03  | 5.892e-10      | 5.460e-10    | 5.947e-10     | 5.782e-10 |
| 1.140e-03  | 5.676e-10      | 5.260e-10    | 5.737e-10     | 5.585e-10 |
| 1.360e-03  | 4.978e-10      | 4.617e-10    | 5.034e-10     | 4.901e-10 |
| 1.560e-03  | 3.479e-10      | 3.238e-10    | 3.521e-10     | 3.431e-10 |
| 1.700e-03  | 2.831e-10      | 2.637e-10    | 2.867e-10     | 2.795e-10 |
| 1.840e-03  | 2.519e-10      | 2.350e-10    | 2.551e-10     | 2.488e-10 |
| 1.910e-03  | 2.230e-10      | 2.084e-10    | 2.259e-10     | 2.203e-10 |
| 2.140e-03  | 1.862e-10      | 1.743e-10    | 1.887e-10     | 1.841e-10 |
| 2.240e-03  | 1.729e-10      | 2.108e-10    | 1.766e-10     | 1.780e-10 |
| 2.410e-03  | 1.637e-10      | 2.051e-10    | 1.673e-10     | 1.693e-10 |
| 2.470e-03  | 1.543e-10      | 1.945e-10    | 1.577e-10     | 1.597e-10 |
| 2.630e-03  | 1.435e-10      | 1.838e-10    | 1.506e-10     | 1.507e-10 |
| 2.750e-03  | 1.277e-10      | 1.658e-10    | 1.343e-10     | 1.346e-10 |
| 2.820e-03  | 1.156e-10      | 1.518e-10    | 1.219e-10     | 1.222e-10 |
| 2.960e-03  | 1.008e-10      | 1.347e-10    | 1.066e-10     | 1.080e-10 |
| 3.180e-03  | 8.290e-11      | 1.138e-10    | 8.805e-11     | 8.954e-11 |
| 3.550e-03  | 7.413e-11      | 1.028e-10    | 7.882e-11     | 8.028e-11 |
| 3.610e-03  | 6.659e-11      | 9.317e-11    | 7.098e-11     | 7.236e-11 |
| 3.700e-03  | 6.354e-11      | 8.926e-11    | 6.944e-11     | 7.024e-11 |
| 3.830e-03  | 5.873e-11      | 8.308e-11    | 6.432e-11     | 6.511e-11 |
| 4.030e-03  | 5.087e-11      | 7.294e-11    | 5.594e-11     | 5.670e-11 |
| 4.150e-03  | 4.610e-11      | 1.504e-10    | 5.090e-11     | 6.012e-11 |
| 4.300e-03  | 4.429e-11      | 1.510e-10    | 4.894e-11     | 5.845e-11 |
| 4.500e-03  | 4.161e-11      | 1.435e-10    | 4.604e-11     | 5.514e-11 |
| 4.810e-03  | 3.706e-11      | 1.305e-10    | 4.110e-11     | 4.947e-11 |
| 5.160e-03  | 3.068e-11      | 1.121e-10    | 3.415e-11     | 4.149e-11 |
| 5.470e-03  | 2.732e-11      | 1.019e-10    | 3.049e-11     | 3.722e-11 |
| 5.550e-03  | 2.557e-11      | 9.638e-11    | 2.857e-11     | 3.498e-11 |
| 5.930e-03  | 2.321e-11      | 8.889e-11    | 2.598e-11     | 3.194e-11 |
| 5.980e-03  | 2.081e-11      | 8.125e-11    | 2.335e-11     | 2.884e-11 |
| 6.250e-03  | 1.995e-11      | 7.846e-11    | 2.240e-11     | 2.773e-11 |
| 6.540e-03  | 1.905e-11      | 7.543e-11    | 2.141e-11     | 2.653e-11 |
| 6.750e-03  | 1.813e-11      | 7.228e-11    | 2.039e-11     | 2.530e-11 |
| 6.980e-03  | 1.720e-11      | 6.910e-11    | 1.937e-11     | 2.407e-11 |
| 7.110e-03  | 1.638e-11      | 6.626e-11    | 1.846e-11     | 2.297e-11 |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Tissue Approx. | Bone (Femur) | Muscle (ICRU) | Std. Man  |
|------------|----------------|--------------|---------------|-----------|
| 7.250e-03  | 1.572e-11      | 6.395e-11    | 1.772e-11     | 2.492e-11 |
| 7.710e-03  | 1.410e-11      | 5.831e-11    | 1.593e-11     | 2.267e-11 |
| 7.940e-03  | 1.204e-11      | 5.110e-11    | 1.365e-11     | 1.977e-11 |
| 8.180e-03  | 1.086e-11      | 4.691e-11    | 1.234e-11     | 1.808e-11 |
| 8.380e-03  | 1.048e-11      | 4.551e-11    | 1.192e-11     | 1.751e-11 |
| 8.600e-03  | 1.013e-11      | 4.417e-11    | 1.152e-11     | 1.696e-11 |
| 8.980e-03  | 9.568e-12      | 4.204e-11    | 1.089e-11     | 1.610e-11 |
| 9.200e-03  | 8.949e-12      | 3.967e-11    | 1.020e-11     | 1.514e-11 |
| 9.400e-03  | 8.478e-12      | 3.786e-11    | 9.671e-12     | 1.441e-11 |
| 9.560e-03  | 8.049e-12      | 3.621e-11    | 9.191e-12     | 1.375e-11 |
| 9.800e-03  | 7.546e-12      | 3.427e-11    | 8.626e-12     | 1.297e-11 |
| 1.000e-02  | 6.961e-12      | 3.201e-11    | 7.971e-12     | 1.206e-11 |
| 1.040e-02  | 6.619e-12      | 3.067e-11    | 7.587e-12     | 1.152e-11 |
| 1.080e-02  | 6.466e-12      | 3.005e-11    | 7.414e-12     | 1.128e-11 |
| 1.110e-02  | 6.307e-12      | 2.939e-11    | 7.234e-12     | 1.102e-11 |
| 1.190e-02  | 6.004e-12      | 2.811e-11    | 6.890e-12     | 1.052e-11 |
| 1.270e-02  | 5.464e-12      | 2.582e-11    | 6.277e-12     | 9.636e-12 |
| 1.300e-02  | 5.024e-12      | 2.395e-11    | 5.779e-12     | 8.911e-12 |
| 1.390e-02  | 4.467e-12      | 2.156e-11    | 5.146e-12     | 7.988e-12 |
| 1.470e-02  | 3.567e-12      | 1.769e-11    | 4.123e-12     | 6.494e-12 |
| 1.520e-02  | 2.832e-12      | 1.451e-11    | 3.287e-12     | 5.269e-12 |
| 1.570e-02  | 2.654e-12      | 1.371e-11    | 3.085e-12     | 4.967e-12 |
| 1.640e-02  | 2.547e-12      | 1.320e-11    | 2.961e-12     | 4.778e-12 |
| 1.700e-02  | 2.415e-12      | 1.256e-11    | 2.808e-12     | 4.541e-12 |
| 1.720e-02  | 2.324e-12      | 1.212e-11    | 2.704e-12     | 4.380e-12 |
| 1.810e-02  | 2.186e-12      | 1.146e-11    | 2.545e-12     | 4.133e-12 |
| 1.900e-02  | 1.934e-12      | 1.024e-11    | 2.254e-12     | 3.682e-12 |
| 1.970e-02  | 1.681e-12      | 9.005e-12    | 1.961e-12     | 3.227e-12 |
| 2.010e-02  | 1.495e-12      | 8.100e-12    | 1.747e-12     | 2.893e-12 |
| 2.100e-02  | 1.437e-12      | 7.806e-12    | 1.679e-12     | 2.787e-12 |
| 2.170e-02  | 1.407e-12      | 7.635e-12    | 1.643e-12     | 2.727e-12 |
| 2.230e-02  | 1.377e-12      | 7.470e-12    | 1.608e-12     | 2.669e-12 |
| 2.310e-02  | 1.339e-12      | 7.264e-12    | 1.564e-12     | 2.597e-12 |
| 2.550e-02  | 1.234e-12      | 6.682e-12    | 1.440e-12     | 2.391e-12 |
| 2.920e-02  | 9.593e-13      | 5.180e-12    | 1.118e-12     | 1.859e-12 |
| 3.320e-02  | 6.451e-13      | 3.433e-12    | 7.479e-13     | 1.244e-12 |
| 3.750e-02  | 5.586e-13      | 2.856e-12    | 6.429e-13     | 1.054e-12 |
| 4.200e-02  | 4.482e-13      | 2.126e-12    | 5.092e-13     | 8.112e-13 |
| 4.740e-02  | 4.020e-13      | 1.746e-12    | 4.506e-13     | 6.937e-13 |
| 4.850e-02  | 3.759e-13      | 1.517e-12    | 4.170e-13     | 6.240e-13 |
| 5.020e-02  | 3.618e-13      | 1.401e-12    | 3.992e-13     | 5.881e-13 |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Tissue Approx. | Bone (Femur) | Muscle (ICRU) | Std. Man  |
|------------|----------------|--------------|---------------|-----------|
| 5.500e-02  | 3.525e-13      | 1.274e-12    | 3.856e-13     | 5.536e-13 |
| 6.100e-02  | 3.420e-13      | 1.092e-12    | 3.689e-13     | 5.062e-13 |
| 6.750e-02  | 3.437e-13      | 9.725e-13    | 3.663e-13     | 4.818e-13 |
| 6.950e-02  | 3.499e-13      | 9.242e-13    | 3.706e-13     | 4.763e-13 |
| 7.350e-02  | 3.526e-13      | 8.802e-13    | 3.716e-13     | 4.690e-13 |
| 7.840e-02  | 3.544e-13      | 8.019e-13    | 3.707e-13     | 4.536e-13 |
| 8.070e-02  | 3.544e-13      | 7.301e-13    | 3.682e-13     | 4.381e-13 |
| 8.550e-02  | 3.620e-13      | 7.101e-13    | 3.748e-13     | 4.398e-13 |
| 8.800e-02  | 3.710e-13      | 6.978e-13    | 3.830e-13     | 4.442e-13 |
| 9.050e-02  | 3.766e-13      | 6.870e-13    | 3.881e-13     | 4.463e-13 |
| 9.230e-02  | 3.812e-13      | 6.763e-13    | 3.922e-13     | 4.476e-13 |
| 9.600e-02  | 3.866e-13      | 6.605e-13    | 3.969e-13     | 4.485e-13 |
| 1.000e-01  | 3.936e-13      | 6.349e-13    | 4.028e-13     | 4.485e-13 |
| 1.050e-01  | 4.199e-13      | 6.395e-13    | 4.284e-13     | 4.703e-13 |
| 1.100e-01  | 4.651e-13      | 6.763e-13    | 4.735e-13     | 5.139e-13 |
| 1.150e-01  | 5.091e-13      | 7.103e-13    | 5.172e-13     | 5.560e-13 |
| 1.210e-01  | 5.560e-13      | 7.443e-13    | 5.638e-13     | 6.005e-13 |
| 1.350e-01  | 6.373e-13      | 7.967e-13    | 6.443e-13     | 6.760e-13 |
| 1.490e-01  | 7.433e-13      | 8.521e-13    | 7.489e-13     | 7.717e-13 |
| 1.640e-01  | 8.498e-13      | 9.190e-13    | 8.544e-13     | 8.704e-13 |
| 1.800e-01  | 9.637e-13      | 1.017e-12    | 9.681e-13     | 9.816e-13 |
| 1.980e-01  | 1.080e-12      | 1.112e-12    | 1.084e-12     | 1.094e-12 |
| 2.180e-01  | 1.205e-12      | 1.219e-12    | 1.208e-12     | 1.216e-12 |
| 2.390e-01  | 1.338e-12      | 1.344e-12    | 1.342e-12     | 1.348e-12 |
| 2.630e-01  | 1.475e-12      | 1.469e-12    | 1.478e-12     | 1.483e-12 |
| 2.900e-01  | 1.615e-12      | 1.595e-12    | 1.619e-12     | 1.621e-12 |
| 3.190e-01  | 1.758e-12      | 1.723e-12    | 1.762e-12     | 1.762e-12 |
| 3.510e-01  | 1.917e-12      | 1.873e-12    | 1.920e-12     | 1.919e-12 |
| 3.860e-01  | 2.075e-12      | 2.023e-12    | 2.079e-12     | 2.077e-12 |
| 4.240e-01  | 2.235e-12      | 2.172e-12    | 2.238e-12     | 2.235e-12 |
| 4.670e-01  | 2.410e-12      | 2.340e-12    | 2.414e-12     | 2.410e-12 |
| 5.130e-01  | 2.588e-12      | 2.509e-12    | 2.593e-12     | 2.588e-12 |
| 5.650e-01  | 2.855e-12      | 2.765e-12    | 2.860e-12     | 2.854e-12 |
| 6.210e-01  | 3.153e-12      | 3.052e-12    | 3.159e-12     | 3.152e-12 |
| 6.830e-01  | 3.471e-12      | 3.357e-12    | 3.477e-12     | 3.469e-12 |
| 7.510e-01  | 3.791e-12      | 3.665e-12    | 3.797e-12     | 3.788e-12 |
| 8.260e-01  | 4.101e-12      | 3.963e-12    | 4.107e-12     | 4.097e-12 |
| 9.090e-01  | 4.439e-12      | 4.289e-12    | 4.446e-12     | 4.435e-12 |
| 1.000e+00  | 4.776e-12      | 4.613e-12    | 4.784e-12     | 4.771e-12 |
| 1.120e+00  | 5.228e-12      | 5.049e-12    | 5.236e-12     | 5.223e-12 |
| 1.270e+00  | 5.827e-12      | 5.628e-12    | 5.837e-12     | 5.822e-12 |

KERMA  
Gray cm\*\*2

| Energy-MeV | Tissue Approx. | Bone (Femur) | Muscle (ICRU) | Std. Man  |
|------------|----------------|--------------|---------------|-----------|
| 1.420e+00  | 6.385e-12      | 6.167e-12    | 6.396e-12     | 6.379e-12 |
| 1.600e+00  | 6.897e-12      | 6.663e-12    | 6.908e-12     | 6.891e-12 |
| 1.800e+00  | 7.519e-12      | 7.267e-12    | 7.531e-12     | 7.512e-12 |
| 2.030e+00  | 8.110e-12      | 7.847e-12    | 8.124e-12     | 8.104e-12 |
| 2.280e+00  | 8.854e-12      | 8.579e-12    | 8.869e-12     | 8.849e-12 |
| 2.570e+00  | 9.700e-12      | 9.418e-12    | 9.717e-12     | 9.697e-12 |
| 2.890e+00  | 1.048e-11      | 1.020e-11    | 1.050e-11     | 1.048e-11 |
| 3.250e+00  | 1.122e-11      | 1.097e-11    | 1.125e-11     | 1.123e-11 |
| 3.650e+00  | 1.216e-11      | 1.193e-11    | 1.219e-11     | 1.218e-11 |
| 4.110e+00  | 1.305e-11      | 1.286e-11    | 1.308e-11     | 1.307e-11 |
| 4.620e+00  | 1.413e-11      | 1.401e-11    | 1.417e-11     | 1.417e-11 |
| 5.200e+00  | 1.527e-11      | 1.524e-11    | 1.532e-11     | 1.533e-11 |
| 5.850e+00  | 1.652e-11      | 1.660e-11    | 1.658e-11     | 1.660e-11 |
| 6.580e+00  | 1.790e-11      | 1.811e-11    | 1.797e-11     | 1.801e-11 |
| 7.410e+00  | 1.959e-11      | 1.998e-11    | 1.968e-11     | 1.973e-11 |
| 8.330e+00  | 2.127e-11      | 2.189e-11    | 2.137e-11     | 2.145e-11 |
| 9.370e+00  | 2.334e-11      | 2.425e-11    | 2.346e-11     | 2.357e-11 |
| 1.060e+01  | 2.569e-11      | 2.699e-11    | 2.583e-11     | 2.599e-11 |
| 1.190e+01  | 2.842e-11      | 3.013e-11    | 2.859e-11     | 2.879e-11 |
| 1.340e+01  | 3.132e-11      | 3.352e-11    | 3.153e-11     | 3.178e-11 |
| 2.000e+01  | 3.968e-11      | 4.360e-11    | 4.000e-11     | 4.043e-11 |
| 3.000e+01  | 5.859e-11      | 6.650e-11    | 5.917e-11     | 6.001e-11 |
| 4.000e+01  | 8.203e-11      | 9.529e-11    | 8.295e-11     | 8.434e-11 |
| 5.000e+01  | 1.068e-10      | 1.259e-10    | 1.081e-10     | 1.101e-10 |
| 7.500e+01  | 1.523e-10      | 1.819e-10    | 1.542e-10     | 1.573e-10 |
| 1.000e+02  | 2.209e-10      | 2.666e-10    | 2.239e-10     | 2.286e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | A-150 Plastic | Nylon 6.6/6 | Lucite    | Liq. Musc. Eq. |
|------------|---------------|-------------|-----------|----------------|
| 1.000e-04  |               |             |           |                |
| 1.080e-04  | 4.510e-10     | 5.113e-10   | 5.814e-10 | 8.250e-10      |
| 1.140e-04  | 4.384e-10     | 4.969e-10   | 5.657e-10 | 8.032e-10      |
| 1.360e-04  | 3.959e-10     | 4.480e-10   | 5.116e-10 | 7.273e-10      |
| 1.560e-04  | 3.048e-10     | 3.428e-10   | 3.932e-10 | 5.603e-10      |
| 1.700e-04  | 2.636e-10     | 2.955e-10   | 3.397e-10 | 4.847e-10      |
| 1.840e-04  | 2.419e-10     | 2.706e-10   | 3.113e-10 | 4.443e-10      |
| 1.910e-04  | 2.215e-10     | 2.473e-10   | 2.847e-10 | 4.063e-10      |
| 2.140e-04  | 1.948e-10     | 2.169e-10   | 2.499e-10 | 3.570e-10      |
| 2.240e-04  | 1.842e-10     | 2.050e-10   | 2.365e-10 | 3.385e-10      |
| 2.410e-04  | 1.758e-10     | 1.958e-10   | 2.261e-10 | 3.245e-10      |
| 2.470e-04  | 1.671e-10     | 1.862e-10   | 2.153e-10 | 3.098e-10      |
| 2.630e-04  | 1.572e-10     | 1.753e-10   | 2.028e-10 | 2.927e-10      |
| 2.750e-04  | 1.429e-10     | 1.594e-10   | 1.847e-10 | 2.678e-10      |
| 2.820e-04  | 1.318e-10     | 1.471e-10   | 1.706e-10 | 2.485e-10      |
| 2.960e-04  | 1.506e-09     | 1.272e-09   | 1.227e-09 | 4.396e-10      |
| 3.180e-04  | 1.583e-09     | 1.330e-09   | 1.278e-09 | 4.249e-10      |
| 3.550e-04  | 1.497e-09     | 1.251e-09   | 1.202e-09 | 3.963e-10      |
| 3.610e-04  | 1.439e-09     | 1.177e-09   | 1.130e-09 | 3.701e-10      |
| 3.700e-04  | 1.403e-09     | 1.146e-09   | 1.100e-09 | 3.593e-10      |
| 3.830e-04  | 1.344e-09     | 1.096e-09   | 1.052e-09 | 3.420e-10      |
| 4.030e-04  | 1.249e-09     | 1.029e-09   | 9.720e-10 | 3.177e-10      |
| 4.150e-04  | 1.242e-09     | 1.181e-09   | 9.194e-10 | 3.584e-10      |
| 4.300e-04  | 1.208e-09     | 1.150e-09   | 8.944e-10 | 3.489e-10      |
| 4.500e-04  | 1.161e-09     | 1.104e-09   | 8.566e-10 | 3.347e-10      |
| 4.810e-04  | 1.076e-09     | 1.023e-09   | 7.907e-10 | 3.098e-10      |
| 5.160e-04  | 9.496e-10     | 9.058e-10   | 6.954e-10 | 2.734e-10      |
| 5.470e-04  | 9.134e-10     | 9.392e-10   | 8.737e-10 | 7.952e-10      |
| 5.550e-04  | 9.121e-10     | 1.009e-09   | 1.090e-09 | 1.358e-09      |
| 5.930e-04  | 8.537e-10     | 9.518e-10   | 1.041e-09 | 1.325e-09      |
| 5.980e-04  | 7.938e-10     | 8.926e-10   | 9.892e-10 | 1.289e-09      |
| 6.250e-04  | 7.654e-10     | 8.626e-10   | 9.591e-10 | 1.258e-09      |
| 6.540e-04  | 7.246e-10     | 8.170e-10   | 9.092e-10 | 1.194e-09      |
| 6.750e-04  | 6.829e-10     | 7.703e-10   | 8.579e-10 | 1.129e-09      |
| 6.980e-04  | 6.539e-10     | 7.241e-10   | 8.072e-10 | 1.064e-09      |
| 7.110e-04  | 6.332e-10     | 6.891e-10   | 7.689e-10 | 1.016e-09      |
| 7.250e-04  | 6.190e-10     | 6.739e-10   | 7.524e-10 | 9.954e-10      |
| 7.710e-04  | 5.840e-10     | 6.361e-10   | 7.117e-10 | 9.455e-10      |
| 7.940e-04  | 5.386e-10     | 5.872e-10   | 6.587e-10 | 8.803e-10      |
| 8.180e-04  | 5.090e-10     | 5.553e-10   | 6.240e-10 | 8.371e-10      |
| 8.380e-04  | 4.909e-10     | 5.358e-10   | 6.023e-10 | 8.090e-10      |
| 8.600e-04  | 4.726e-10     | 5.160e-10   | 5.802e-10 | 7.803e-10      |

KERMA  
Gray cm\*\*2

| Energy-MeV | A-150 Plastic | Nylon 6.6/6 | Lucite    | Liq. Musc. Eq. |
|------------|---------------|-------------|-----------|----------------|
| 8.980e-04  | 4.437e-10     | 4.847e-10   | 5.454e-10 | 7.349e-10      |
| 9.200e-04  | 4.174e-10     | 4.562e-10   | 5.137e-10 | 6.938e-10      |
| 9.400e-04  | 4.059e-10     | 4.439e-10   | 5.001e-10 | 6.765e-10      |
| 9.560e-04  | 3.954e-10     | 4.326e-10   | 4.875e-10 | 6.606e-10      |
| 9.800e-04  | 3.828e-10     | 4.191e-10   | 4.725e-10 | 6.415e-10      |
| 9.900e-04  | 3.715e-10     | 4.070e-10   | 4.591e-10 | 6.243e-10      |
| 1.000e-03  | 3.645e-10     | 3.995e-10   | 4.508e-10 | 6.138e-10      |
| 1.080e-03  | 3.549e-10     | 3.891e-10   | 4.393e-10 | 5.988e-10      |
| 1.140e-03  | 3.412e-10     | 3.742e-10   | 4.227e-10 | 5.769e-10      |
| 1.360e-03  | 2.975e-10     | 3.265e-10   | 3.694e-10 | 5.061e-10      |
| 1.560e-03  | 2.042e-10     | 2.245e-10   | 2.555e-10 | 3.538e-10      |
| 1.700e-03  | 1.643e-10     | 1.808e-10   | 2.065e-10 | 2.881e-10      |
| 1.840e-03  | 1.455e-10     | 1.602e-10   | 1.832e-10 | 2.563e-10      |
| 1.910e-03  | 1.281e-10     | 1.411e-10   | 1.617e-10 | 2.269e-10      |
| 2.140e-03  | 1.060e-10     | 1.169e-10   | 1.343e-10 | 1.895e-10      |
| 2.240e-03  | 9.815e-11     | 1.082e-10   | 1.245e-10 | 1.760e-10      |
| 2.410e-03  | 9.277e-11     | 1.023e-10   | 1.177e-10 | 1.667e-10      |
| 2.470e-03  | 8.726e-11     | 9.619e-11   | 1.108e-10 | 1.571e-10      |
| 2.630e-03  | 8.096e-11     | 8.925e-11   | 1.029e-10 | 1.461e-10      |
| 2.750e-03  | 7.178e-11     | 7.915e-11   | 9.137e-11 | 1.301e-10      |
| 2.820e-03  | 6.475e-11     | 7.141e-11   | 8.253e-11 | 1.178e-10      |
| 2.960e-03  | 5.614e-11     | 6.193e-11   | 7.172e-11 | 1.027e-10      |
| 3.180e-03  | 4.577e-11     | 5.050e-11   | 5.866e-11 | 8.447e-11      |
| 3.550e-03  | 4.078e-11     | 4.500e-11   | 5.233e-11 | 7.554e-11      |
| 3.610e-03  | 3.651e-11     | 4.029e-11   | 4.692e-11 | 6.787e-11      |
| 3.700e-03  | 3.479e-11     | 3.839e-11   | 4.473e-11 | 6.476e-11      |
| 3.830e-03  | 3.208e-11     | 3.539e-11   | 4.128e-11 | 5.987e-11      |
| 4.030e-03  | 2.764e-11     | 3.050e-11   | 3.563e-11 | 5.186e-11      |
| 4.150e-03  | 3.544e-11     | 2.754e-11   | 3.222e-11 | 4.701e-11      |
| 4.300e-03  | 3.481e-11     | 2.643e-11   | 3.093e-11 | 4.516e-11      |
| 4.500e-03  | 3.283e-11     | 2.479e-11   | 2.903e-11 | 4.243e-11      |
| 4.810e-03  | 2.945e-11     | 2.200e-11   | 2.580e-11 | 3.779e-11      |
| 5.160e-03  | 2.469e-11     | 1.810e-11   | 2.127e-11 | 3.129e-11      |
| 5.470e-03  | 2.215e-11     | 1.606e-11   | 1.890e-11 | 2.786e-11      |
| 5.550e-03  | 2.081e-11     | 1.500e-11   | 1.767e-11 | 2.608e-11      |
| 5.930e-03  | 1.900e-11     | 1.358e-11   | 1.601e-11 | 2.367e-11      |
| 5.980e-03  | 1.715e-11     | 1.213e-11   | 1.432e-11 | 2.123e-11      |
| 6.250e-03  | 1.649e-11     | 1.162e-11   | 1.372e-11 | 2.035e-11      |
| 6.540e-03  | 1.579e-11     | 1.108e-11   | 1.309e-11 | 1.944e-11      |
| 6.750e-03  | 1.507e-11     | 1.053e-11   | 1.245e-11 | 1.850e-11      |
| 6.980e-03  | 1.434e-11     | 9.985e-12   | 1.181e-11 | 1.756e-11      |
| 7.110e-03  | 1.369e-11     | 9.497e-12   | 1.124e-11 | 1.672e-11      |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | A-150 Plastic | Nylon 6.6/6 | Lucite    | Liq. Musc. Eq. |
|------------|---------------|-------------|-----------|----------------|
| 7.250e-03  | 1.317e-11     | 9.103e-12   | 1.077e-11 | 1.604e-11      |
| 7.710e-03  | 1.189e-11     | 8.142e-12   | 9.647e-12 | 1.439e-11      |
| 7.940e-03  | 1.027e-11     | 6.924e-12   | 8.217e-12 | 1.229e-11      |
| 8.180e-03  | 9.325e-12     | 6.223e-12   | 7.394e-12 | 1.108e-11      |
| 8.380e-03  | 9.020e-12     | 6.002e-12   | 7.134e-12 | 1.070e-11      |
| 8.600e-03  | 8.733e-12     | 5.795e-12   | 6.890e-12 | 1.034e-11      |
| 8.980e-03  | 8.276e-12     | 5.467e-12   | 6.503e-12 | 9.767e-12      |
| 9.200e-03  | 7.772e-12     | 5.106e-12   | 6.077e-12 | 9.136e-12      |
| 9.400e-03  | 7.386e-12     | 4.831e-12   | 5.752e-12 | 8.655e-12      |
| 9.560e-03  | 7.036e-12     | 4.581e-12   | 5.457e-12 | 8.218e-12      |
| 9.800e-03  | 6.623e-12     | 4.287e-12   | 5.111e-12 | 7.704e-12      |
| 1.000e-02  | 6.144e-12     | 3.946e-12   | 4.708e-12 | 7.108e-12      |
| 1.040e-02  | 5.863e-12     | 3.747e-12   | 4.473e-12 | 6.759e-12      |
| 1.080e-02  | 5.736e-12     | 3.660e-12   | 4.369e-12 | 6.603e-12      |
| 1.110e-02  | 5.602e-12     | 3.568e-12   | 4.261e-12 | 6.440e-12      |
| 1.190e-02  | 5.347e-12     | 3.395e-12   | 4.054e-12 | 6.130e-12      |
| 1.270e-02  | 4.889e-12     | 3.086e-12   | 3.687e-12 | 5.579e-12      |
| 1.300e-02  | 4.515e-12     | 2.835e-12   | 3.389e-12 | 5.131e-12      |
| 1.390e-02  | 4.040e-12     | 2.517e-12   | 3.010e-12 | 4.562e-12      |
| 1.470e-02  | 3.272e-12     | 2.003e-12   | 2.398e-12 | 3.643e-12      |
| 1.520e-02  | 2.642e-12     | 1.583e-12   | 1.899e-12 | 2.893e-12      |
| 1.570e-02  | 2.489e-12     | 1.483e-12   | 1.779e-12 | 2.711e-12      |
| 1.640e-02  | 2.394e-12     | 1.424e-12   | 1.708e-12 | 2.602e-12      |
| 1.700e-02  | 2.276e-12     | 1.351e-12   | 1.619e-12 | 2.467e-12      |
| 1.720e-02  | 2.196e-12     | 1.301e-12   | 1.559e-12 | 2.374e-12      |
| 1.810e-02  | 2.072e-12     | 1.224e-12   | 1.467e-12 | 2.233e-12      |
| 1.900e-02  | 1.846e-12     | 1.084e-12   | 1.299e-12 | 1.976e-12      |
| 1.970e-02  | 1.619e-12     | 9.436e-13   | 1.130e-12 | 1.717e-12      |
| 2.010e-02  | 1.452e-12     | 8.404e-13   | 1.005e-12 | 1.527e-12      |
| 2.100e-02  | 1.400e-12     | 8.094e-13   | 9.674e-13 | 1.468e-12      |
| 2.170e-02  | 1.372e-12     | 7.940e-13   | 9.481e-13 | 1.436e-12      |
| 2.230e-02  | 1.345e-12     | 7.788e-13   | 9.291e-13 | 1.406e-12      |
| 2.310e-02  | 1.310e-12     | 7.596e-13   | 9.053e-13 | 1.368e-12      |
| 2.550e-02  | 1.212e-12     | 7.043e-13   | 8.371e-13 | 1.259e-12      |
| 2.920e-02  | 9.550e-13     | 5.592e-13   | 6.591e-13 | 9.790e-13      |
| 3.320e-02  | 6.589e-13     | 3.938e-13   | 4.557e-13 | 6.575e-13      |
| 3.750e-02  | 5.747e-13     | 3.550e-13   | 4.046e-13 | 5.687e-13      |
| 4.200e-02  | 4.657e-13     | 3.038e-13   | 3.381e-13 | 4.555e-13      |
| 4.740e-02  | 4.190e-13     | 2.885e-13   | 3.146e-13 | 4.078e-13      |
| 4.850e-02  | 3.920e-13     | 2.806e-13   | 3.018e-13 | 3.808e-13      |
| 5.020e-02  | 3.775e-13     | 2.757e-13   | 2.945e-13 | 3.663e-13      |
| 5.500e-02  | 3.674e-13     | 2.767e-13   | 2.928e-13 | 3.565e-13      |

KERMA  
Gray cm\*\*2

| Energy-MeV | A-150 Plastic | Nylon 6.6/6 | Lucite    | Liq. Musc. Eq. |
|------------|---------------|-------------|-----------|----------------|
| 6.100e-02  | 3.553e-13     | 2.809e-13   | 2.928e-13 | 3.453e-13      |
| 6.750e-02  | 3.557e-13     | 2.929e-13   | 3.018e-13 | 3.465e-13      |
| 6.950e-02  | 3.612e-13     | 3.035e-13   | 3.111e-13 | 3.525e-13      |
| 7.350e-02  | 3.633e-13     | 3.100e-13   | 3.165e-13 | 3.551e-13      |
| 7.840e-02  | 3.640e-13     | 3.184e-13   | 3.229e-13 | 3.566e-13      |
| 8.070e-02  | 3.630e-13     | 3.243e-13   | 3.271e-13 | 3.564e-13      |
| 8.550e-02  | 3.701e-13     | 3.340e-13   | 3.361e-13 | 3.639e-13      |
| 8.800e-02  | 3.787e-13     | 3.446e-13   | 3.461e-13 | 3.727e-13      |
| 9.050e-02  | 3.840e-13     | 3.515e-13   | 3.525e-13 | 3.783e-13      |
| 9.230e-02  | 3.883e-13     | 3.572e-13   | 3.579e-13 | 3.829e-13      |
| 9.600e-02  | 3.933e-13     | 3.643e-13   | 3.644e-13 | 3.883e-13      |
| 1.000e-01  | 3.997e-13     | 3.737e-13   | 3.730e-13 | 3.951e-13      |
| 1.050e-01  | 4.256e-13     | 4.017e-13   | 4.000e-13 | 4.214e-13      |
| 1.100e-01  | 4.707e-13     | 4.473e-13   | 4.448e-13 | 4.666e-13      |
| 1.150e-01  | 5.145e-13     | 4.919e-13   | 4.885e-13 | 5.106e-13      |
| 1.210e-01  | 5.613e-13     | 5.396e-13   | 5.352e-13 | 5.576e-13      |
| 1.350e-01  | 6.420e-13     | 6.226e-13   | 6.164e-13 | 6.389e-13      |
| 1.490e-01  | 7.469e-13     | 7.319e-13   | 7.230e-13 | 7.449e-13      |
| 1.640e-01  | 8.526e-13     | 8.409e-13   | 8.295e-13 | 8.515e-13      |
| 1.800e-01  | 9.662e-13     | 9.553e-13   | 9.420e-13 | 9.656e-13      |
| 1.980e-01  | 1.082e-12     | 1.072e-12   | 1.057e-12 | 1.082e-12      |
| 2.180e-01  | 1.206e-12     | 1.198e-12   | 1.180e-12 | 1.207e-12      |
| 2.390e-01  | 1.340e-12     | 1.332e-12   | 1.312e-12 | 1.341e-12      |
| 2.630e-01  | 1.476e-12     | 1.468e-12   | 1.446e-12 | 1.477e-12      |
| 2.900e-01  | 1.616e-12     | 1.609e-12   | 1.584e-12 | 1.618e-12      |
| 3.190e-01  | 1.758e-12     | 1.752e-12   | 1.725e-12 | 1.761e-12      |
| 3.510e-01  | 1.917e-12     | 1.910e-12   | 1.881e-12 | 1.920e-12      |
| 3.860e-01  | 2.075e-12     | 2.069e-12   | 2.037e-12 | 2.079e-12      |
| 4.240e-01  | 2.234e-12     | 2.228e-12   | 2.193e-12 | 2.238e-12      |
| 4.670e-01  | 2.410e-12     | 2.403e-12   | 2.366e-12 | 2.414e-12      |
| 5.130e-01  | 2.588e-12     | 2.581e-12   | 2.541e-12 | 2.592e-12      |
| 5.650e-01  | 2.854e-12     | 2.847e-12   | 2.803e-12 | 2.860e-12      |
| 6.210e-01  | 3.153e-12     | 3.145e-12   | 3.096e-12 | 3.159e-12      |
| 6.830e-01  | 3.470e-12     | 3.462e-12   | 3.408e-12 | 3.477e-12      |
| 7.510e-01  | 3.790e-12     | 3.781e-12   | 3.722e-12 | 3.797e-12      |
| 8.260e-01  | 4.100e-12     | 4.090e-12   | 4.026e-12 | 4.108e-12      |
| 9.090e-01  | 4.438e-12     | 4.428e-12   | 4.359e-12 | 4.446e-12      |
| 1.000e+00  | 4.775e-12     | 4.764e-12   | 4.689e-12 | 4.784e-12      |
| 1.120e+00  | 5.227e-12     | 5.215e-12   | 5.133e-12 | 5.237e-12      |
| 1.270e+00  | 5.826e-12     | 5.813e-12   | 5.722e-12 | 5.837e-12      |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | A-150 Plastic | Nylon 6.6/6 | Lucite    | Liq. Musc. Eq. |
|------------|---------------|-------------|-----------|----------------|
| 1.420e+00  | 6.383e-12     | 6.369e-12   | 6.269e-12 | 6.396e-12      |
| 1.600e+00  | 6.895e-12     | 6.879e-12   | 6.772e-12 | 6.909e-12      |
| 1.800e+00  | 7.513e-12     | 7.497e-12   | 7.380e-12 | 7.531e-12      |
| 2.030e+00  | 8.101e-12     | 8.083e-12   | 7.959e-12 | 8.124e-12      |
| 2.280e+00  | 8.839e-12     | 8.819e-12   | 8.686e-12 | 8.869e-12      |
| 2.570e+00  | 9.675e-12     | 9.653e-12   | 9.510e-12 | 9.716e-12      |
| 2.890e+00  | 1.044e-11     | 1.042e-11   | 1.027e-11 | 1.050e-11      |
| 3.250e+00  | 1.117e-11     | 1.114e-11   | 1.099e-11 | 1.124e-11      |
| 3.650e+00  | 1.208e-11     | 1.205e-11   | 1.189e-11 | 1.218e-11      |
| 4.110e+00  | 1.293e-11     | 1.290e-11   | 1.274e-11 | 1.307e-11      |
| 4.620e+00  | 1.397e-11     | 1.394e-11   | 1.378e-11 | 1.416e-11      |
| 5.200e+00  | 1.506e-11     | 1.502e-11   | 1.487e-11 | 1.530e-11      |
| 5.850e+00  | 1.624e-11     | 1.621e-11   | 1.606e-11 | 1.656e-11      |
| 6.580e+00  | 1.755e-11     | 1.751e-11   | 1.737e-11 | 1.795e-11      |
| 7.410e+00  | 1.913e-11     | 1.909e-11   | 1.897e-11 | 1.964e-11      |
| 8.330e+00  | 2.068e-11     | 2.063e-11   | 2.053e-11 | 2.132e-11      |
| 9.370e+00  | 2.259e-11     | 2.254e-11   | 2.247e-11 | 2.340e-11      |
| 1.060e+01  | 2.474e-11     | 2.468e-11   | 2.465e-11 | 2.576e-11      |
| 1.190e+01  | 2.725e-11     | 2.719e-11   | 2.721e-11 | 2.850e-11      |
| 1.340e+01  | 2.990e-11     | 2.983e-11   | 2.991e-11 | 3.142e-11      |
| 2.000e+01  | 3.739e-11     | 3.731e-11   | 3.760e-11 | 3.982e-11      |
| 3.000e+01  | 5.429e-11     | 5.417e-11   | 5.497e-11 | 5.883e-11      |
| 4.000e+01  | 7.504e-11     | 7.488e-11   | 7.638e-11 | 8.240e-11      |
| 5.000e+01  | 9.691e-11     | 9.672e-11   | 9.900e-11 | 1.073e-10      |
| 7.500e+01  | 1.370e-10     | 1.367e-10   | 1.404e-10 | 1.530e-10      |
| 1.000e+02  | 1.974e-10     | 1.971e-10   | 2.030e-10 | 2.221e-10      |

KERMA  
Gray cm\*\*2

| Energy-MeV | Water     | Acetylene | Dry Air   | Water Sat. Air |
|------------|-----------|-----------|-----------|----------------|
| 1.000e-04  |           |           |           |                |
| 1.080e-04  | 8.949e-10 | 4.017e-10 | 7.626e-10 | 7.646e-10      |
| 1.140e-04  | 8.714e-10 | 3.903e-10 | 7.428e-10 | 7.447e-10      |
| 1.360e-04  | 7.893e-10 | 3.519e-10 | 6.722e-10 | 6.739e-10      |
| 1.560e-04  | 6.087e-10 | 2.692e-10 | 5.133e-10 | 5.147e-10      |
| 1.700e-04  | 5.267e-10 | 2.320e-10 | 4.426e-10 | 4.438e-10      |
| 1.840e-04  | 4.829e-10 | 2.125e-10 | 4.058e-10 | 4.069e-10      |
| 1.910e-04  | 4.416e-10 | 1.942e-10 | 3.708e-10 | 3.719e-10      |
| 2.140e-04  | 3.881e-10 | 1.703e-10 | 3.256e-10 | 3.265e-10      |
| 2.240e-04  | 3.681e-10 | 1.605e-10 | 3.091e-10 | 3.099e-10      |
| 2.410e-04  | 3.530e-10 | 1.529e-10 | 2.967e-10 | 2.975e-10      |
| 2.470e-04  | 3.372e-10 | 1.449e-10 | 2.861e-10 | 2.869e-10      |
| 2.630e-04  | 3.188e-10 | 1.359e-10 | 3.021e-10 | 3.023e-10      |
| 2.750e-04  | 2.918e-10 | 1.228e-10 | 2.765e-10 | 2.767e-10      |
| 2.820e-04  | 2.710e-10 | 1.128e-10 | 2.552e-10 | 2.555e-10      |
| 2.960e-04  | 2.451e-10 | 1.752e-09 | 2.327e-10 | 2.328e-10      |
| 3.180e-04  | 2.136e-10 | 1.848e-09 | 2.053e-10 | 2.054e-10      |
| 3.550e-04  | 1.967e-10 | 1.740e-09 | 1.924e-10 | 1.925e-10      |
| 3.610e-04  | 1.818e-10 | 1.638e-09 | 1.791e-10 | 1.791e-10      |
| 3.700e-04  | 1.757e-10 | 1.595e-09 | 1.735e-10 | 1.735e-10      |
| 3.830e-04  | 1.660e-10 | 1.527e-09 | 1.646e-10 | 1.646e-10      |
| 4.030e-04  | 1.499e-10 | 1.412e-09 | 2.454e-10 | 2.440e-10      |
| 4.150e-04  | 1.400e-10 | 1.337e-09 | 1.495e-09 | 1.476e-09      |
| 4.300e-04  | 1.360e-10 | 1.301e-09 | 1.465e-09 | 1.446e-09      |
| 4.500e-04  | 1.300e-10 | 1.246e-09 | 1.417e-09 | 1.399e-09      |
| 4.810e-04  | 1.196e-10 | 1.150e-09 | 1.333e-09 | 1.316e-09      |
| 5.160e-04  | 1.043e-10 | 1.012e-09 | 1.207e-09 | 1.191e-09      |
| 5.470e-04  | 7.455e-10 | 9.314e-10 | 1.294e-09 | 1.286e-09      |
| 5.550e-04  | 1.429e-09 | 8.864e-10 | 1.425e-09 | 1.425e-09      |
| 5.930e-04  | 1.402e-09 | 8.247e-10 | 1.352e-09 | 1.353e-09      |
| 5.980e-04  | 1.373e-09 | 7.615e-10 | 1.277e-09 | 1.279e-09      |
| 6.250e-04  | 1.341e-09 | 7.328e-10 | 1.237e-09 | 1.238e-09      |
| 6.540e-04  | 1.274e-09 | 6.932e-10 | 1.172e-09 | 1.174e-09      |
| 6.750e-04  | 1.205e-09 | 6.527e-10 | 1.107e-09 | 1.108e-09      |
| 6.980e-04  | 1.136e-09 | 6.127e-10 | 1.042e-09 | 1.043e-09      |
| 7.110e-04  | 1.085e-09 | 5.822e-10 | 9.925e-10 | 9.939e-10      |
| 7.250e-04  | 1.064e-09 | 5.686e-10 | 9.717e-10 | 9.731e-10      |
| 7.710e-04  | 1.011e-09 | 5.348e-10 | 9.202e-10 | 9.215e-10      |
| 7.940e-04  | 9.429e-10 | 4.912e-10 | 8.531e-10 | 8.545e-10      |
| 8.180e-04  | 8.974e-10 | 4.630e-10 | 8.093e-10 | 8.106e-10      |
| 8.380e-04  | 8.675e-10 | 4.462e-10 | 7.819e-10 | 7.831e-10      |
| 8.600e-04  | 8.369e-10 | 4.293e-10 | 7.541e-10 | 7.553e-10      |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Water     | Acetylene | Dry Air   | Water Sat. Air |
|------------|-----------|-----------|-----------|----------------|
| 8.980e-04  | 7.886e-10 | 4.025e-10 | 7.100e-10 | 7.112e-10      |
| 9.200e-04  | 7.448e-10 | 3.780e-10 | 6.702e-10 | 6.713e-10      |
| 9.400e-04  | 7.264e-10 | 3.671e-10 | 6.536e-10 | 6.547e-10      |
| 9.560e-04  | 7.095e-10 | 3.572e-10 | 6.384e-10 | 6.394e-10      |
| 9.800e-04  | 6.893e-10 | 3.453e-10 | 6.201e-10 | 6.211e-10      |
| 9.900e-04  | 6.710e-10 | 3.347e-10 | 6.036e-10 | 6.046e-10      |
| 1.000e-03  | 6.598e-10 | 3.282e-10 | 5.934e-10 | 5.944e-10      |
| 1.080e-03  | 6.439e-10 | 3.193e-10 | 5.787e-10 | 5.797e-10      |
| 1.140e-03  | 6.205e-10 | 3.067e-10 | 5.570e-10 | 5.579e-10      |
| 1.360e-03  | 5.448e-10 | 2.667e-10 | 4.871e-10 | 4.880e-10      |
| 1.560e-03  | 3.818e-10 | 1.816e-10 | 3.375e-10 | 3.382e-10      |
| 1.700e-03  | 3.113e-10 | 1.453e-10 | 2.732e-10 | 2.737e-10      |
| 1.840e-03  | 2.772e-10 | 1.284e-10 | 2.425e-10 | 2.430e-10      |
| 1.910e-03  | 2.456e-10 | 1.127e-10 | 2.141e-10 | 2.146e-10      |
| 2.140e-03  | 2.054e-10 | 9.289e-11 | 1.781e-10 | 1.785e-10      |
| 2.240e-03  | 1.908e-10 | 8.582e-11 | 1.651e-10 | 1.655e-10      |
| 2.410e-03  | 1.807e-10 | 8.102e-11 | 1.562e-10 | 1.565e-10      |
| 2.470e-03  | 1.704e-10 | 7.612e-11 | 1.471e-10 | 1.474e-10      |
| 2.630e-03  | 1.585e-10 | 7.052e-11 | 1.366e-10 | 1.369e-10      |
| 2.750e-03  | 1.412e-10 | 6.238e-11 | 1.214e-10 | 1.217e-10      |
| 2.820e-03  | 1.279e-10 | 5.615e-11 | 1.097e-10 | 1.100e-10      |
| 2.960e-03  | 1.116e-10 | 4.852e-11 | 9.540e-11 | 9.563e-11      |
| 3.180e-03  | 9.194e-11 | 3.934e-11 | 7.810e-11 | 7.831e-11      |
| 3.550e-03  | 8.226e-11 | 3.497e-11 | 7.708e-11 | 7.715e-11      |
| 3.610e-03  | 7.393e-11 | 3.124e-11 | 6.985e-11 | 6.990e-11      |
| 3.700e-03  | 7.056e-11 | 2.974e-11 | 6.672e-11 | 6.677e-11      |
| 3.830e-03  | 6.525e-11 | 2.737e-11 | 6.180e-11 | 6.184e-11      |
| 4.030e-03  | 5.657e-11 | 2.350e-11 | 5.373e-11 | 5.377e-11      |
| 4.150e-03  | 5.130e-11 | 2.117e-11 | 4.883e-11 | 4.886e-11      |
| 4.300e-03  | 4.929e-11 | 2.029e-11 | 4.693e-11 | 4.696e-11      |
| 4.500e-03  | 4.633e-11 | 1.901e-11 | 4.414e-11 | 4.416e-11      |
| 4.810e-03  | 4.128e-11 | 1.683e-11 | 3.937e-11 | 3.940e-11      |
| 5.160e-03  | 3.420e-11 | 1.379e-11 | 3.269e-11 | 3.271e-11      |
| 5.470e-03  | 3.048e-11 | 1.220e-11 | 2.916e-11 | 2.918e-11      |
| 5.550e-03  | 2.854e-11 | 1.139e-11 | 2.732e-11 | 2.734e-11      |
| 5.930e-03  | 2.591e-11 | 1.028e-11 | 2.483e-11 | 2.485e-11      |
| 5.980e-03  | 2.324e-11 | 9.165e-12 | 2.231e-11 | 2.232e-11      |
| 6.250e-03  | 2.229e-11 | 8.768e-12 | 2.140e-11 | 2.141e-11      |
| 6.540e-03  | 2.129e-11 | 8.358e-12 | 2.045e-11 | 2.046e-11      |
| 6.750e-03  | 2.026e-11 | 7.936e-12 | 1.947e-11 | 1.948e-11      |
| 6.980e-03  | 1.923e-11 | 7.516e-12 | 1.850e-11 | 1.850e-11      |
| 7.110e-03  | 1.832e-11 | 7.142e-12 | 1.762e-11 | 1.763e-11      |

KERMA  
Gray cm\*\*2

| Energy-MeV | Water     | Acetylene | Dry Air   | Water Sat. Air |
|------------|-----------|-----------|-----------|----------------|
| 7.250e-03  | 1.758e-11 | 6.841e-12 | 1.692e-11 | 1.693e-11      |
| 7.710e-03  | 1.578e-11 | 6.106e-12 | 1.520e-11 | 1.521e-11      |
| 7.940e-03  | 1.349e-11 | 5.175e-12 | 1.302e-11 | 1.302e-11      |
| 8.180e-03  | 1.216e-11 | 4.640e-12 | 1.176e-11 | 1.176e-11      |
| 8.380e-03  | 1.174e-11 | 4.472e-12 | 1.136e-11 | 1.136e-11      |
| 8.600e-03  | 1.135e-11 | 4.315e-12 | 1.098e-11 | 1.098e-11      |
| 8.980e-03  | 1.072e-11 | 4.067e-12 | 1.038e-11 | 1.038e-11      |
| 9.200e-03  | 1.003e-11 | 3.794e-12 | 9.718e-12 | 9.721e-12      |
| 9.400e-03  | 9.506e-12 | 3.586e-12 | 9.213e-12 | 9.216e-12      |
| 9.560e-03  | 9.027e-12 | 3.397e-12 | 8.755e-12 | 8.757e-12      |
| 9.800e-03  | 8.465e-12 | 3.175e-12 | 8.215e-12 | 8.217e-12      |
| 1.000e-02  | 7.812e-12 | 2.918e-12 | 7.588e-12 | 7.590e-12      |
| 1.040e-02  | 7.430e-12 | 2.768e-12 | 7.222e-12 | 7.223e-12      |
| 1.080e-02  | 7.258e-12 | 2.703e-12 | 7.057e-12 | 7.058e-12      |
| 1.110e-02  | 7.080e-12 | 2.635e-12 | 6.885e-12 | 6.887e-12      |
| 1.190e-02  | 6.740e-12 | 2.506e-12 | 6.557e-12 | 6.559e-12      |
| 1.270e-02  | 6.135e-12 | 2.276e-12 | 5.973e-12 | 5.974e-12      |
| 1.300e-02  | 5.643e-12 | 2.089e-12 | 5.497e-12 | 5.498e-12      |
| 1.390e-02  | 5.019e-12 | 1.852e-12 | 4.894e-12 | 4.895e-12      |
| 1.470e-02  | 4.010e-12 | 1.470e-12 | 3.919e-12 | 3.919e-12      |
| 1.520e-02  | 3.186e-12 | 1.158e-12 | 3.122e-12 | 3.122e-12      |
| 1.570e-02  | 2.986e-12 | 1.084e-12 | 2.929e-12 | 2.929e-12      |
| 1.640e-02  | 2.866e-12 | 1.042e-12 | 2.811e-12 | 2.812e-12      |
| 1.700e-02  | 2.717e-12 | 9.882e-13 | 2.666e-12 | 2.666e-12      |
| 1.720e-02  | 2.615e-12 | 9.519e-13 | 2.566e-12 | 2.566e-12      |
| 1.810e-02  | 2.459e-12 | 8.963e-13 | 2.414e-12 | 2.415e-12      |
| 1.900e-02  | 2.175e-12 | 7.946e-13 | 2.137e-12 | 2.137e-12      |
| 1.970e-02  | 1.890e-12 | 6.923e-13 | 1.859e-12 | 1.859e-12      |
| 2.010e-02  | 1.681e-12 | 6.172e-13 | 1.655e-12 | 1.655e-12      |
| 2.100e-02  | 1.616e-12 | 5.953e-13 | 1.591e-12 | 1.591e-12      |
| 2.170e-02  | 1.581e-12 | 5.850e-13 | 1.556e-12 | 1.556e-12      |
| 2.230e-02  | 1.547e-12 | 5.747e-13 | 1.523e-12 | 1.523e-12      |
| 2.310e-02  | 1.505e-12 | 5.616e-13 | 1.481e-12 | 1.481e-12      |
| 2.550e-02  | 1.384e-12 | 5.234e-13 | 1.362e-12 | 1.362e-12      |
| 2.920e-02  | 1.074e-12 | 4.218e-13 | 1.056e-12 | 1.056e-12      |
| 3.320e-02  | 7.176e-13 | 3.068e-13 | 7.041e-13 | 7.042e-13      |
| 3.750e-02  | 6.178e-13 | 2.839e-13 | 6.037e-13 | 6.038e-13      |
| 4.200e-02  | 4.908e-13 | 2.524e-13 | 4.762e-13 | 4.764e-13      |
| 4.740e-02  | 4.360e-13 | 2.471e-13 | 4.199e-13 | 4.201e-13      |
| 4.850e-02  | 4.048e-13 | 2.452e-13 | 3.875e-13 | 3.877e-13      |
| 5.020e-02  | 3.882e-13 | 2.433e-13 | 3.705e-13 | 3.707e-13      |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Water     | Acetylene | Dry Air   | Water Sat. Air |
|------------|-----------|-----------|-----------|----------------|
| 5.500e-02  | 3.761e-13 | 2.476e-13 | 3.572e-13 | 3.574e-13      |
| 6.100e-02  | 3.615e-13 | 2.564e-13 | 3.405e-13 | 3.408e-13      |
| 6.750e-02  | 3.606e-13 | 2.714e-13 | 3.371e-13 | 3.374e-13      |
| 6.950e-02  | 3.657e-13 | 2.833e-13 | 3.406e-13 | 3.409e-13      |
| 7.350e-02  | 3.674e-13 | 2.909e-13 | 3.412e-13 | 3.416e-13      |
| 7.840e-02  | 3.675e-13 | 3.012e-13 | 3.397e-13 | 3.401e-13      |
| 8.070e-02  | 3.660e-13 | 3.089e-13 | 3.369e-13 | 3.373e-13      |
| 8.550e-02  | 3.731e-13 | 3.191e-13 | 3.427e-13 | 3.431e-13      |
| 8.800e-02  | 3.817e-13 | 3.300e-13 | 3.501e-13 | 3.505e-13      |
| 9.050e-02  | 3.870e-13 | 3.372e-13 | 3.546e-13 | 3.550e-13      |
| 9.230e-02  | 3.914e-13 | 3.432e-13 | 3.582e-13 | 3.586e-13      |
| 9.600e-02  | 3.964e-13 | 3.507e-13 | 3.623e-13 | 3.628e-13      |
| 1.000e-01  | 4.028e-13 | 3.607e-13 | 3.674e-13 | 3.679e-13      |
| 1.050e-01  | 4.290e-13 | 3.887e-13 | 3.905e-13 | 3.911e-13      |
| 1.100e-01  | 4.745e-13 | 4.336e-13 | 4.313e-13 | 4.319e-13      |
| 1.150e-01  | 5.187e-13 | 4.776e-13 | 4.709e-13 | 4.715e-13      |
| 1.210e-01  | 5.659e-13 | 5.247e-13 | 5.130e-13 | 5.138e-13      |
| 1.350e-01  | 6.475e-13 | 6.068e-13 | 5.859e-13 | 5.867e-13      |
| 1.490e-01  | 7.537e-13 | 7.152e-13 | 6.804e-13 | 6.815e-13      |
| 1.640e-01  | 8.607e-13 | 8.230e-13 | 7.759e-13 | 7.771e-13      |
| 1.800e-01  | 9.756e-13 | 9.356e-13 | 8.789e-13 | 8.803e-13      |
| 1.980e-01  | 1.093e-12 | 1.051e-12 | 9.837e-13 | 9.853e-13      |
| 2.180e-01  | 1.218e-12 | 1.174e-12 | 1.097e-12 | 1.099e-12      |
| 2.390e-01  | 1.354e-12 | 1.306e-12 | 1.218e-12 | 1.220e-12      |
| 2.630e-01  | 1.491e-12 | 1.439e-12 | 1.342e-12 | 1.344e-12      |
| 2.900e-01  | 1.633e-12 | 1.578e-12 | 1.469e-12 | 1.471e-12      |
| 3.190e-01  | 1.777e-12 | 1.719e-12 | 1.599e-12 | 1.601e-12      |
| 3.510e-01  | 1.937e-12 | 1.874e-12 | 1.743e-12 | 1.745e-12      |
| 3.860e-01  | 2.098e-12 | 2.030e-12 | 1.887e-12 | 1.890e-12      |
| 4.240e-01  | 2.259e-12 | 2.186e-12 | 2.031e-12 | 2.034e-12      |
| 4.670e-01  | 2.436e-12 | 2.358e-12 | 2.191e-12 | 2.194e-12      |
| 5.130e-01  | 2.616e-12 | 2.532e-12 | 2.353e-12 | 2.356e-12      |
| 5.650e-01  | 2.885e-12 | 2.794e-12 | 2.595e-12 | 2.599e-12      |
| 6.210e-01  | 3.187e-12 | 3.086e-12 | 2.866e-12 | 2.871e-12      |
| 6.830e-01  | 3.508e-12 | 3.397e-12 | 3.155e-12 | 3.160e-12      |
| 7.510e-01  | 3.831e-12 | 3.710e-12 | 3.445e-12 | 3.451e-12      |
| 8.260e-01  | 4.145e-12 | 4.014e-12 | 3.727e-12 | 3.733e-12      |
| 9.090e-01  | 4.487e-12 | 4.345e-12 | 4.035e-12 | 4.041e-12      |
| 1.000e+00  | 4.827e-12 | 4.675e-12 | 4.341e-12 | 4.347e-12      |
| 1.120e+00  | 5.284e-12 | 5.118e-12 | 4.752e-12 | 4.759e-12      |
| 1.270e+00  | 5.890e-12 | 5.704e-12 | 5.296e-12 | 5.305e-12      |
| 1.420e+00  | 6.453e-12 | 6.250e-12 | 5.804e-12 | 5.813e-12      |

**KERMA**  
**Gray cm\*\*2**

| Energy-MeV | Water     | Acetylene | Dry Air   | Water Sat. Air |
|------------|-----------|-----------|-----------|----------------|
| 1.600e+00  | 6.971e-12 | 6.750e-12 | 6.270e-12 | 6.280e-12      |
| 1.800e+00  | 7.599e-12 | 7.356e-12 | 6.836e-12 | 6.847e-12      |
| 2.030e+00  | 8.198e-12 | 7.930e-12 | 7.378e-12 | 7.389e-12      |
| 2.280e+00  | 8.951e-12 | 8.651e-12 | 8.059e-12 | 8.071e-12      |
| 2.570e+00  | 9.807e-12 | 9.468e-12 | 8.836e-12 | 8.850e-12      |
| 2.890e+00  | 1.060e-11 | 1.021e-11 | 9.555e-12 | 9.570e-12      |
| 3.250e+00  | 1.135e-11 | 1.092e-11 | 1.025e-11 | 1.027e-11      |
| 3.650e+00  | 1.230e-11 | 1.181e-11 | 1.112e-11 | 1.114e-11      |
| 4.110e+00  | 1.321e-11 | 1.264e-11 | 1.196e-11 | 1.198e-11      |
| 4.620e+00  | 1.431e-11 | 1.365e-11 | 1.298e-11 | 1.300e-11      |
| 5.200e+00  | 1.547e-11 | 1.470e-11 | 1.407e-11 | 1.409e-11      |
| 5.850e+00  | 1.675e-11 | 1.585e-11 | 1.526e-11 | 1.528e-11      |
| 6.580e+00  | 1.816e-11 | 1.711e-11 | 1.659e-11 | 1.661e-11      |
| 7.410e+00  | 1.988e-11 | 1.864e-11 | 1.821e-11 | 1.824e-11      |
| 8.330e+00  | 2.160e-11 | 2.013e-11 | 1.985e-11 | 1.988e-11      |
| 9.370e+00  | 2.372e-11 | 2.197e-11 | 2.188e-11 | 2.190e-11      |
| 1.060e+01  | 2.613e-11 | 2.403e-11 | 2.420e-11 | 2.422e-11      |
| 1.190e+01  | 2.893e-11 | 2.644e-11 | 2.687e-11 | 2.690e-11      |
| 1.340e+01  | 3.191e-11 | 2.898e-11 | 2.975e-11 | 2.978e-11      |
| 2.000e+01  | 4.052e-11 | 3.615e-11 | 3.813e-11 | 3.817e-11      |
| 3.000e+01  | 5.999e-11 | 5.229e-11 | 5.715e-11 | 5.719e-11      |
| 4.000e+01  | 8.416e-11 | 7.207e-11 | 8.089e-11 | 8.093e-11      |
| 5.000e+01  | 1.097e-10 | 9.292e-11 | 1.061e-10 | 1.061e-10      |
| 7.500e+01  | 1.566e-10 | 1.311e-10 | 1.522e-10 | 1.523e-10      |
| 1.000e+02  | 2.274e-10 | 1.887e-10 | 2.220e-10 | 2.221e-10      |

**KERMA**  
**Gray cm\*\*2**

Energy-MeV Carbon Dioxide Ethylene Gas TE, w/Methane

| 1.000e-04 | 8.314e-10 | 3.854e-10 | 6.354e-10 |
|-----------|-----------|-----------|-----------|
| 1.080e-04 | 8.109e-10 | 3.735e-10 | 6.181e-10 |
| 1.140e-04 | 7.368e-10 | 3.351e-10 | 5.587e-10 |
| 1.360e-04 | 5.682e-10 | 2.559e-10 | 4.294e-10 |
| 1.560e-04 | 4.922e-10 | 2.201e-10 | 3.709e-10 |
| 1.700e-04 | 4.517e-10 | 2.013e-10 | 3.399e-10 |
| 1.840e-04 | 4.132e-10 | 1.839e-10 | 3.107e-10 |
| 2.140e-04 | 3.632e-10 | 1.611e-10 | 2.729e-10 |
| 2.240e-04 | 3.446e-10 | 1.517e-10 | 2.583e-10 |
| 2.410e-04 | 3.305e-10 | 1.442e-10 | 2.472e-10 |
| 2.470e-04 | 3.157e-10 | 1.366e-10 | 2.355e-10 |
| 2.630e-04 | 2.983e-10 | 1.280e-10 | 2.221e-10 |
| 2.750e-04 | 2.726e-10 | 1.157e-10 | 2.025e-10 |
| 2.820e-04 | 2.527e-10 | 1.062e-10 | 1.874e-10 |
| 2.960e-04 | 7.167e-10 | 1.627e-09 | 9.854e-10 |
| 3.180e-04 | 7.197e-10 | 1.717e-09 | 1.018e-09 |
| 3.550e-04 | 6.742e-10 | 1.616e-09 | 9.560e-10 |
| 3.610e-04 | 6.321e-10 | 1.521e-09 | 8.984e-10 |
| 3.700e-04 | 6.144e-10 | 1.482e-09 | 8.742e-10 |
| 3.830e-04 | 5.863e-10 | 1.418e-09 | 8.356e-10 |
| 4.030e-04 | 5.394e-10 | 1.311e-09 | 7.756e-10 |
| 4.150e-04 | 5.091e-10 | 1.241e-09 | 7.922e-10 |
| 4.300e-04 | 4.951e-10 | 1.208e-09 | 7.711e-10 |
| 4.500e-04 | 4.741e-10 | 1.157e-09 | 7.391e-10 |
| 4.810e-04 | 4.373e-10 | 1.068e-09 | 6.833e-10 |
| 5.160e-04 | 3.842e-10 | 9.397e-10 | 6.024e-10 |
| 5.470e-04 | 8.853e-10 | 8.648e-10 | 8.525e-10 |
| 5.550e-04 | 1.431e-09 | 8.230e-10 | 1.141e-09 |
| 5.930e-04 | 1.392e-09 | 7.657e-10 | 1.095e-09 |
| 5.980e-04 | 1.349e-09 | 7.071e-10 | 1.048e-09 |
| 6.250e-04 | 1.315e-09 | 6.804e-10 | 1.018e-09 |
| 6.540e-04 | 1.248e-09 | 6.436e-10 | 9.650e-10 |
| 6.750e-04 | 1.179e-09 | 6.060e-10 | 9.111e-10 |
| 6.980e-04 | 1.111e-09 | 5.689e-10 | 8.577e-10 |
| 7.110e-04 | 1.060e-09 | 5.406e-10 | 8.174e-10 |
| 7.250e-04 | 1.039e-09 | 5.279e-10 | 8.003e-10 |
| 7.710e-04 | 9.860e-10 | 4.966e-10 | 7.579e-10 |
| 7.940e-04 | 9.171e-10 | 4.561e-10 | 7.027e-10 |
| 8.180e-04 | 8.715e-10 | 4.299e-10 | 6.664e-10 |
| 8.380e-04 | 8.420e-10 | 4.143e-10 | 6.435e-10 |
| 8.600e-04 | 8.120e-10 | 3.985e-10 | 6.202e-10 |

KERMA  
Gray cm\*\*2

| Energy-MeV | Carbon Dioxide | Ethylene Gas | TE, w/Methane |
|------------|----------------|--------------|---------------|
| 8.980e-04  | 7.645e-10      | 3.736e-10    | 5.834e-10     |
| 9.200e-04  | 7.214e-10      | 3.509e-10    | 5.499e-10     |
| 9.400e-04  | 7.032e-10      | 3.408e-10    | 5.356e-10     |
| 9.560e-04  | 6.864e-10      | 3.316e-10    | 5.224e-10     |
| 9.800e-04  | 6.663e-10      | 3.206e-10    | 5.067e-10     |
| 9.900e-04  | 6.483e-10      | 3.107e-10    | 4.925e-10     |
| 1.000e-03  | 6.371e-10      | 3.047e-10    | 4.838e-10     |
| 1.080e-03  | 6.215e-10      | 2.964e-10    | 4.717e-10     |
| 1.140e-03  | 5.986e-10      | 2.847e-10    | 4.540e-10     |
| 1.360e-03  | 5.248e-10      | 2.476e-10    | 3.973e-10     |
| 1.560e-03  | 3.663e-10      | 1.686e-10    | 2.756e-10     |
| 1.700e-03  | 2.978e-10      | 1.349e-10    | 2.233e-10     |
| 1.840e-03  | 2.649e-10      | 1.192e-10    | 1.982e-10     |
| 1.910e-03  | 2.344e-10      | 1.046e-10    | 1.751e-10     |
| 2.140e-03  | 1.956e-10      | 8.623e-11    | 1.457e-10     |
| 2.240e-03  | 1.816e-10      | 7.966e-11    | 1.351e-10     |
| 2.410e-03  | 1.719e-10      | 7.521e-11    | 1.278e-10     |
| 2.470e-03  | 1.620e-10      | 7.066e-11    | 1.204e-10     |
| 2.630e-03  | 1.506e-10      | 6.547e-11    | 1.118e-10     |
| 2.750e-03  | 1.340e-10      | 5.791e-11    | 9.939e-11     |
| 2.820e-03  | 1.213e-10      | 5.212e-11    | 8.985e-11     |
| 2.960e-03  | 1.057e-10      | 4.504e-11    | 7.816e-11     |
| 3.180e-03  | 8.690e-11      | 3.652e-11    | 6.404e-11     |
| 3.550e-03  | 7.768e-11      | 3.246e-11    | 5.718e-11     |
| 3.610e-03  | 6.976e-11      | 2.900e-11    | 5.129e-11     |
| 3.700e-03  | 6.656e-11      | 2.761e-11    | 4.891e-11     |
| 3.830e-03  | 6.151e-11      | 2.541e-11    | 4.516e-11     |
| 4.030e-03  | 5.326e-11      | 2.181e-11    | 3.903e-11     |
| 4.150e-03  | 4.826e-11      | 1.965e-11    | 3.532e-11     |
| 4.300e-03  | 4.635e-11      | 1.884e-11    | 3.391e-11     |
| 4.500e-03  | 4.355e-11      | 1.765e-11    | 3.184e-11     |
| 4.810e-03  | 3.877e-11      | 1.563e-11    | 2.832e-11     |
| 5.160e-03  | 3.208e-11      | 1.280e-11    | 2.338e-11     |
| 5.470e-03  | 2.856e-11      | 1.133e-11    | 2.079e-11     |
| 5.550e-03  | 2.673e-11      | 1.057e-11    | 1.944e-11     |
| 5.930e-03  | 2.425e-11      | 9.545e-12    | 1.762e-11     |
| 5.980e-03  | 2.174e-11      | 8.508e-12    | 1.578e-11     |
| 6.250e-03  | 2.084e-11      | 8.140e-12    | 1.512e-11     |
| 6.540e-03  | 1.990e-11      | 7.758e-12    | 1.443e-11     |
| 6.750e-03  | 1.893e-11      | 7.367e-12    | 1.373e-11     |
| 6.980e-03  | 1.797e-11      | 6.977e-12    | 1.302e-11     |
| 7.110e-03  | 1.711e-11      | 6.630e-12    | 1.239e-11     |

**KERMA**  
**Gray cm\*\*2**

**Energy-MeV Carbon Dioxide Ethylene Gas TE, w/Methane**

|           |           |           |           |
|-----------|-----------|-----------|-----------|
| 7.250e-03 | 1.641e-11 | 6.351e-12 | 1.189e-11 |
| 7.710e-03 | 1.472e-11 | 5.669e-12 | 1.065e-11 |
| 7.940e-03 | 1.257e-11 | 4.804e-12 | 9.079e-12 |
| 8.180e-03 | 1.133e-11 | 4.307e-12 | 8.175e-12 |
| 8.380e-03 | 1.094e-11 | 4.152e-12 | 7.888e-12 |
| 8.600e-03 | 1.057e-11 | 4.006e-12 | 7.620e-12 |
| 8.980e-03 | 9.981e-12 | 3.776e-12 | 7.194e-12 |
| 9.200e-03 | 9.335e-12 | 3.523e-12 | 6.725e-12 |
| 9.400e-03 | 8.842e-12 | 3.330e-12 | 6.367e-12 |
| 9.560e-03 | 8.394e-12 | 3.154e-12 | 6.042e-12 |
| 9.800e-03 | 7.868e-12 | 2.948e-12 | 5.660e-12 |
| 1.000e-02 | 7.257e-12 | 2.709e-12 | 5.217e-12 |
| 1.040e-02 | 6.900e-12 | 2.571e-12 | 4.958e-12 |
| 1.080e-02 | 6.740e-12 | 2.510e-12 | 4.843e-12 |
| 1.110e-02 | 6.573e-12 | 2.447e-12 | 4.723e-12 |
| 1.190e-02 | 6.256e-12 | 2.328e-12 | 4.495e-12 |
| 1.270e-02 | 5.692e-12 | 2.115e-12 | 4.089e-12 |
| 1.300e-02 | 5.233e-12 | 1.942e-12 | 3.759e-12 |
| 1.390e-02 | 4.651e-12 | 1.722e-12 | 3.340e-12 |
| 1.470e-02 | 3.712e-12 | 1.368e-12 | 2.663e-12 |
| 1.520e-02 | 2.944e-12 | 1.079e-12 | 2.111e-12 |
| 1.570e-02 | 2.759e-12 | 1.011e-12 | 1.978e-12 |
| 1.640e-02 | 2.647e-12 | 9.715e-13 | 1.899e-12 |
| 1.700e-02 | 2.508e-12 | 9.224e-13 | 1.800e-12 |
| 1.720e-02 | 2.414e-12 | 8.889e-13 | 1.733e-12 |
| 1.810e-02 | 2.269e-12 | 8.377e-13 | 1.631e-12 |
| 1.900e-02 | 2.006e-12 | 7.438e-13 | 1.444e-12 |
| 1.970e-02 | 1.742e-12 | 6.494e-13 | 1.256e-12 |
| 2.010e-02 | 1.548e-12 | 5.800e-13 | 1.117e-12 |
| 2.100e-02 | 1.487e-12 | 5.600e-13 | 1.075e-12 |
| 2.170e-02 | 1.454e-12 | 5.510e-13 | 1.053e-12 |
| 2.230e-02 | 1.423e-12 | 5.418e-13 | 1.032e-12 |
| 2.310e-02 | 1.384e-12 | 5.301e-13 | 1.005e-12 |
| 2.550e-02 | 1.273e-12 | 4.956e-13 | 9.285e-13 |
| 2.920e-02 | 9.854e-13 | 4.031e-13 | 7.288e-13 |
| 3.320e-02 | 6.562e-13 | 2.986e-13 | 5.006e-13 |
| 3.750e-02 | 5.639e-13 | 2.797e-13 | 4.417e-13 |
| 4.200e-02 | 4.468e-13 | 2.529e-13 | 3.655e-13 |
| 4.740e-02 | 3.961e-13 | 2.506e-13 | 3.371e-13 |
| 4.850e-02 | 3.673e-13 | 2.506e-13 | 3.215e-13 |
| 5.020e-02 | 3.520e-13 | 2.495e-13 | 3.127e-13 |
| 5.500e-02 | 3.407e-13 | 2.552e-13 | 3.095e-13 |

KERMA  
Gray cm\*\*2

| Energy-MeV | Carbon Dioxide | Ethylene Gas | TE, w/Methane |
|------------|----------------|--------------|---------------|
| 6.100e-02  | 3.271e-13      | 2.660e-13    | 3.074e-13     |
| 6.750e-02  | 3.259e-13      | 2.830e-13    | 3.151e-13     |
| 6.950e-02  | 3.303e-13      | 2.961e-13    | 3.239e-13     |
| 7.350e-02  | 3.318e-13      | 3.045e-13    | 3.288e-13     |
| 7.840e-02  | 3.317e-13      | 3.161e-13    | 3.345e-13     |
| 8.070e-02  | 3.302e-13      | 3.248e-13    | 3.379e-13     |
| 8.550e-02  | 3.366e-13      | 3.359e-13    | 3.468e-13     |
| 8.800e-02  | 3.443e-13      | 3.476e-13    | 3.567e-13     |
| 9.050e-02  | 3.491e-13      | 3.553e-13    | 3.631e-13     |
| 9.230e-02  | 3.530e-13      | 3.618e-13    | 3.683e-13     |
| 9.600e-02  | 3.575e-13      | 3.699e-13    | 3.747e-13     |
| 1.000e-01  | 3.632e-13      | 3.808e-13    | 3.832e-13     |
| 1.050e-01  | 3.867e-13      | 4.106e-13    | 4.105e-13     |
| 1.100e-01  | 4.276e-13      | 4.584e-13    | 4.561e-13     |
| 1.150e-01  | 4.675e-13      | 5.051e-13    | 5.005e-13     |
| 1.210e-01  | 5.099e-13      | 5.551e-13    | 5.480e-13     |
| 1.350e-01  | 5.833e-13      | 6.425e-13    | 6.305e-13     |
| 1.490e-01  | 6.789e-13      | 7.578e-13    | 7.388e-13     |
| 1.640e-01  | 7.752e-13      | 8.724e-13    | 8.470e-13     |
| 1.800e-01  | 8.786e-13      | 9.919e-13    | 9.615e-13     |
| 1.980e-01  | 9.838e-13      | 1.114e-12    | 1.078e-12     |
| 2.180e-01  | 1.097e-12      | 1.245e-12    | 1.204e-12     |
| 2.390e-01  | 1.219e-12      | 1.385e-12    | 1.338e-12     |
| 2.630e-01  | 1.343e-12      | 1.527e-12    | 1.475e-12     |
| 2.900e-01  | 1.471e-12      | 1.673e-12    | 1.616e-12     |
| 3.190e-01  | 1.601e-12      | 1.823e-12    | 1.759e-12     |
| 3.510e-01  | 1.745e-12      | 1.988e-12    | 1.918e-12     |
| 3.860e-01  | 1.889e-12      | 2.153e-12    | 2.077e-12     |
| 4.240e-01  | 2.034e-12      | 2.318e-12    | 2.237e-12     |
| 4.670e-01  | 2.194e-12      | 2.501e-12    | 2.413e-12     |
| 5.130e-01  | 2.356e-12      | 2.686e-12    | 2.591e-12     |
| 5.650e-01  | 2.599e-12      | 2.963e-12    | 2.858e-12     |
| 6.210e-01  | 2.870e-12      | 3.273e-12    | 3.157e-12     |
| 6.830e-01  | 3.159e-12      | 3.603e-12    | 3.475e-12     |
| 7.510e-01  | 3.450e-12      | 3.935e-12    | 3.795e-12     |
| 8.260e-01  | 3.732e-12      | 4.257e-12    | 4.106e-12     |
| 9.090e-01  | 4.040e-12      | 4.609e-12    | 4.445e-12     |
| 1.000e+00  | 4.347e-12      | 4.959e-12    | 4.782e-12     |
| 1.120e+00  | 4.759e-12      | 5.428e-12    | 5.235e-12     |
| 1.270e+00  | 5.304e-12      | 6.050e-12    | 5.835e-12     |
| 1.420e+00  | 5.812e-12      | 6.629e-12    | 6.394e-12     |
| 1.600e+00  | 6.279e-12      | 7.159e-12    | 6.906e-12     |

**KERMA**  
**Gray cm\*\*2**

**Energy-MeV Carbon Dioxide Ethylene Gas TE, w/Methane**

|           |           |           |           |
|-----------|-----------|-----------|-----------|
| 1.800e+00 | 6.846e-12 | 7.801e-12 | 7.527e-12 |
| 2.030e+00 | 7.388e-12 | 8.408e-12 | 8.117e-12 |
| 2.280e+00 | 8.071e-12 | 9.169e-12 | 8.858e-12 |
| 2.570e+00 | 8.850e-12 | 1.003e-11 | 9.699e-12 |
| 2.890e+00 | 9.572e-12 | 1.081e-11 | 1.047e-11 |
| 3.250e+00 | 1.027e-11 | 1.155e-11 | 1.121e-11 |
| 3.650e+00 | 1.115e-11 | 1.248e-11 | 1.213e-11 |
| 4.110e+00 | 1.199e-11 | 1.334e-11 | 1.300e-11 |
| 4.620e+00 | 1.301e-11 | 1.438e-11 | 1.405e-11 |
| 5.200e+00 | 1.411e-11 | 1.547e-11 | 1.516e-11 |
| 5.850e+00 | 1.531e-11 | 1.665e-11 | 1.638e-11 |
| 6.580e+00 | 1.665e-11 | 1.794e-11 | 1.771e-11 |
| 7.410e+00 | 1.828e-11 | 1.951e-11 | 1.934e-11 |
| 8.330e+00 | 1.993e-11 | 2.101e-11 | 2.094e-11 |
| 9.370e+00 | 2.198e-11 | 2.286e-11 | 2.291e-11 |
| 1.060e+01 | 2.432e-11 | 2.492e-11 | 2.514e-11 |
| 1.190e+01 | 2.702e-11 | 2.736e-11 | 2.774e-11 |
| 1.340e+01 | 2.992e-11 | 2.990e-11 | 3.050e-11 |
| 2.000e+01 | 3.840e-11 | 3.698e-11 | 3.834e-11 |
| 3.000e+01 | 5.762e-11 | 5.290e-11 | 5.605e-11 |
| 4.000e+01 | 8.164e-11 | 7.227e-11 | 7.788e-11 |
| 5.000e+01 | 1.071e-10 | 9.264e-11 | 1.009e-10 |
| 7.500e+01 | 1.538e-10 | 1.299e-10 | 1.432e-10 |
| 1.000e+02 | 2.245e-10 | 1.861e-10 | 2.069e-10 |

## Weight Fractions of Composite Materials

### Tissue Approximation:

|          |       |
|----------|-------|
| Hydrogen | .1002 |
| Carbon   | .1493 |
| Nitrogen | .0348 |
| Oxygen   | .7157 |

### Bone (Femur):

|            |       |
|------------|-------|
| Hydrogen   | .0640 |
| Carbon     | .2780 |
| Nitrogen   | .0270 |
| Oxygen     | .4100 |
| Magnesium  | .0020 |
| Phosphorus | .0700 |
| Sulfur     | .0020 |
| Calcium    | .1470 |

### Muscle (ICRU):

|            |       |
|------------|-------|
| Hydrogen   | .1020 |
| Carbon     | .1230 |
| Nitrogen   | .0350 |
| Oxygen     | .7290 |
| Sodium     | .0008 |
| Magnesium  | .0002 |
| Phosphorus | .0020 |
| Sulfur     | .0050 |
| Potassium  | .0030 |
| Calcium    | .0001 |

### Standard Man:

|            |       |
|------------|-------|
| Hydrogen   | .1000 |
| Carbon     | .1800 |
| Nitrogen   | .0300 |
| Oxygen     | .6500 |
| Sodium     | .0015 |
| Magnesium  | .0005 |
| Phosphorus | .0100 |
| Sulfur     | .0025 |
| Chlorine   | .0015 |
| Potassium  | .0020 |
| Calcium    | .0150 |
| Iron       | .0070 |

### Weight Fractions of Composite Materials

A-150 Plastic:

|          |       |
|----------|-------|
| Hydrogen | .1015 |
| Carbon   | .7754 |
| Nitrogen | .0352 |
| Oxygen   | .0521 |
| Flourine | .0174 |
| Calcium  | .0184 |

Nylon Type 6 or 6/6:

|          |       |
|----------|-------|
| Hydrogen | .0980 |
| Carbon   | .6368 |
| Nitrogen | .1238 |
| Oxygen   | .1414 |

Lucite:

|          |       |
|----------|-------|
| Hydrogen | .0805 |
| Carbon   | .5998 |
| Oxygen   | .3196 |

Liquid, Muscle Equivalent:

|          |       |
|----------|-------|
| Hydrogen | .1020 |
| Carbon   | .1201 |
| Nitrogen | .0354 |
| Oxygen   | .7425 |

Water:

|          |       |
|----------|-------|
| Hydrogen | .1119 |
| Oxygen   | .8881 |

Acetylene:

|          |       |
|----------|-------|
| Hydrogen | .0774 |
| Carbon   | .9226 |

Air, Dry:

|          |       |
|----------|-------|
| Carbon   | .0001 |
| Nitrogen | .7552 |
| Oxygen   | .2318 |
| Argon    | .0129 |

### **Weight Fractions of Composite Materials**

**Air, Water Saturated:**

|          |       |
|----------|-------|
| Hydrogen | .0016 |
| Carbon   | .0001 |
| Nitrogen | .7443 |
| Oxygen   | .2413 |
| Argon    | .0127 |

**Carbon Dioxide:**

|        |       |
|--------|-------|
| Carbon | .2729 |
| Oxygen | .7271 |

**Ethylene:**

|          |       |
|----------|-------|
| Hydrogen | .1437 |
| Carbon   | .8563 |

**TE Gas, with Methane:**

|          |       |
|----------|-------|
| Hydrogen | .1019 |
| Carbon   | .4562 |
| Nitrogen | .0352 |
| Oxygen   | .4068 |